Iceni Academy Hockwold

EYFS, KS1 & KS2 Mathematics
Long Term Planning

Yearly planning grids for each class
&
Overview of objectives to be covered
for each strand EYFS-Y6

Education
Endowment
Foundation

IMPROVING MATHEMATICS IN THE EARLY YEARS AND KEY STAGE 1

Summary of recommendations

1

Develop practitioners'understanding of how children learn mathematics

- Professional development should be used to raise the quality of practitioner' knowledge of mathematics, of children's mathematical development and of effective mathematical pedagogy.
- Developmental progressions show us how children typically learn mathematical concepts and can inform teaching.
- Practitioners should be aware that developing a secure grasp of early mathematical ideas takes time, and specific skills may emerge in different orders.
- The development of self-regulation and metacognitive skills are linked to successful learning in early mathematics.

2

Dedicate time for children to learn mathematics and integrate mathematics throughout the day

- Dedicate time to focus on mathematics each day.
- Explore mathematics through different contexts, including storybooks, puzzles, songs, rhymes, puppet play, and games.
- Make the most of moments throughout the day to highlight and use mathematics, for example, in daily routines, play activities, and other curriculum areas.
- Seize chances to reinforce mathematical vocabulary.
- Create opportunities for extended discussion of mathematical ideas with children.

3

Use manipulatives and representations to develop understanding

- Manipulatives and representations can be powerful tools for supporting young children to engage with mathematical ideas.
- Ensure that children understand the links between the manipulatives and the mathematical ideas they represent.
- Ensure that there is a clear rationale for using a particular manipulative or representation to teach a specific mathematical concept.
- Encourage children to represent problems in their own way, for example with drawings and marks.
- Use manipulatives and representations to encourage discussion about mathematics.
- Encourage children to use their fingers—an important manipulative for children.

4

Ensure that teaching builds on what children already know

- It is important to assess what children do, and do not, know in order to extend learning for all children.
- A variety of methods should be used to assess children's mathematical understanding, and practitioners should check what children know in a variety of contexts
- Carefully listen to children's responses and consider the right questions to ask to reveal understanding.
- Information collected should be used to inform next steps for teaching. Developmental progressions can be useful in informing decisions around what a child should learn next.

5

Use high quality targeted support to help all children learn mathematics

- High quality targeted support can provide effective extra support for children.
- Small-group support is more likely to be effective when:
- children with the greatest needs are supported by the most experienced staff;
- training, support and resources are provided for staff using targeted activities;
- sessions are brief and regular; and
- explicit connections are made between targeted support and everyday activities or teaching.
- Using an approach or programme that is evidence-based and has been independently evaluated is a good starting point.

EYFS

A1 Week 1	**BASELINE** Fast recognition of up to 3 numbers, without having to count them individually (subitising)			
Week 2	Recite numbers past 5			
Week 3	Say one number for each item in order 1, ,2, 3, 4, 5 Show 'finger numbers' up to 5			
		Objective/skill	TL Activity	Continuous Provision
Week 4	**Number and place value**	Know that the last number reached when counting a small set of objects tells you how many there are in total (cardinal principle)	Children to count a number of objects and say how many there are up to 10. IWB, counters, beads, animals etc.	Talking peg match the numeral to the quantity. Tuff tray: put 5 pigs in the pen etc
Week 5		Link numerals and amounts: for example showing the right number of objects to match the numeral up to 5.	As above but using number cards.	
Week 6	2d shapes	Talk about and explore 2d shapes using informal and mathematical language: sides, corners, straight, flat, round. Select shapes appropriately and combine shapes to make new ones.	2d Treasure hunt What's in the bag? shape game	Making a model house Cut and stick a shape picture. Identify the shapes talking peg Sorting activity. Computer/ipad activities
Week 7	Positional Language	Understand position through words alone. Describe a familiar route. Discuss routes and locations using words like in front of and behind	Items together and asking a child to put one on top, in front, behind etc another object. Walking around school	Recorded maths book.

ONGOING: Experiment with their own symbols and makes marks as well as numerals./count beyond ten

A2		Objective/skill	TL Activity	Continuous Provision
Week 1	Number and place value	Solve real world mathematical problems with numbers up to 5 Compare quantities using language 'more than', 'fewer than'.	Telling the children a word based maths problem such as there are 4 cakes and Lily wants two, how many will we have left?	Setting up the table for dinner in the house. Making a car and working out how many wheels it needs. Cutting a cake into 3
Week 2	Measuring	Make comparisons between objects relating to size	Tallest and shortest objects	Ordering the toys talking peg.
Week 3	Patterns	Talk about and identifies the patterns around them, for example stripes on clothes, designs on rugs on wallpaper. Use informal language like: pointy, spotty, blobs etc. Extend and create ABAB patterns Notice and correct an error in a repeating pattern.	Show different examples of patterns and ask the children to look for some more. Model how to make a pattern, use the term repeating.	Wallpapers and different patterns dotted around the environment Repeating pattern necklace. Talking pegs
Week 4	Measuring	Make comparisons between objects relating to weight	Demonstrating scales using items from class and children to guess which will be heavier. Using vocab heavier, lighter, weighing, scales.	Leaving scales out.
Week 5	**Time**	Begin to describe a sequence of events, real and fictional, using words such as first, then…	Two point instruction. Reading a traditional tale and recapping with First, then, etc.	Cut and stick times of the day
Week 6	Assessment Week*			
Week 7	Christmas Week*			

*We will complete number based rhymes, problem solving during these times.

S1		Objective/skill	TL Activity	Continuous Provision
Week 1	Number and place value	Counts objects, actions and sounds	Model counting actions and sounds using musical instruments, coins in a tin etc	Can you make 3 beats on the drum, 5 star jumps etc Talking pegs.
Week 2		Subitise. Understanding that the numeral represents the same quantity whether large or small in size.	Demonstrating this and asking children to answer Qs.	
Week 3	Measuring	Compare capacity	Which holds more? Experiment. Talk about full, half-full and empty.	Cut and stick activity
Week 4	Number and place value	Explore the composition of numbers to 10 Link the number symbol with its cardinal number value.	Counting to 10 forwards and backwards. Ordering to 10 Recognising the numerals Writing numerals	Writing numbers on a WB talking peg Number tiles Pipe cleaner numbers Padlock number keys
Week 5	Shape	Talk about and explore 3d shapes using informal and mathematical language: sides, corners, straight, flat, round.	3d Treasure hunt What's in the bag? Shape game	3d shapes highlighted in the environment Identify the shapes talking peg Sorting activity. Computer/Ipad activities
Week 6	Number and place values	Compare numbers Understand the 'one more, one less' between two consecutive numbers.	Which is the bigger number? Two numbers and multilink to work it out. 1 more 1 less check as done every day.	

S2		Objective/skill	TL Activity	Continuous Provision
Week 1	Number and place value	Subitise 2 number that make 5	Teacher to demonstrate. Assess children's ability to do this.	
Week 2	Shape	Select, rotate and manipulate shapes in order to develop spatial reasoning skills	Using pro board games and ipads for children to practise the skill of finding the correct shape and getting it to fit.	Jigaws and puzzles
Week 3	Measuring	Compare height	Teacher to explain what height means and how to measure height using three children. Cutting and sticking height activity	Talking peg height order animals Making towers talking peg
Week 4	Numbers and place value	Introducing number bonds to 10	Numicon Number bonds song	Online games Numicon
Week 5	Measuring And end of term assessment	Compare length	Hand measuring objects in school for length and deciding on the longest and how we know that. Up to 3 items.	Measuring with their feet talking peg. Ordering tools in the shed.

Su1		Objective/skill	TL Activity	Continuous Provision
Week 1	Pattern	Continue, copy and recreate patterns	Children to copy teacher's pattern on the board and continue it. Make ABC patterns	Make ABC patterns using natural materials gathered from a walk
Week 2	Number and place value	Verbally count to 20, recognising the patterns of the counting system	Counting One more, one less Understand what a ten and a one is and breaking this down for numbers 10-20.	Computer games Numicon
Week 3	Shape	Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can.	Start with a square and two triangles and a circle on IWB. Children to work out for themselves which shapes fit into which. Using large shapes outside?	Cut and stick activity Large shapes out for children to experiment
Week 4	Number and place value	Double facts and halving of numbers to 10	Doubling robot ppt Ladybird spots intro etc.	Challenge table act
Week 5	Number and place value	Distributing quantities equally	Afternoon tea sharing intro and activity.	Challenge table act of talking peg to share the pens out equally.
Week 6	Number and place value	Explore and represent patterns within numbers up to 10, including evens and odds.	Numicon Even friends number!	Sorting odds and evens
Week 7	Number and place value	Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. Also assessment	Introduce with ppt Group work using resources	Ipad challenge

Su2		Objective/skill	TL Activity	Continuous Provision
Week 1	Number and place value	Automatically recall of number bonds to 5 and some to 10, including double facts	Knowing that 5-3 = 2 so 3+2=5. Inverse.	Number bonds matching
Week 2	Number and place value	Verbally count beyond 20, recognising the patterns of the counting system	Counting One more, one less Understand what a ten and a one is and breaking this down for numbers 20-30.	Computer games Numicon
Week 3	Time	Days of the week Times of the day, such as breakfast Learning to tell the o'clock time	Using individual clocks Making clocks	Talking pegs make the time
Week 4	Money	Recognising coins to £2	Ppt	Paying for items in the shop
Week 5	Addition	Adding two numbers together by counting on	Introducing + = sign if the children are ready.	Challenge area
Week 6	Transition			
Week 7				

Oak Class – Mathematics Yearly Pacer

	Autumn	Spring	Summer
WK 1	Number and Place Value	Algebra	Y6 AfL Revision (+ unequal sharing from km to miles conversion) Y5 Fractions
WK 2	SATS/Y5 baseline test	Y6 Algebra / Y5 Fractions	Year 6 AfL Revision Y5 Measure & Geometry
WK 3	Number and Place Value	Measures	Year 6 AfL Revision Y5 SATS
WK 4	Operations	Number and Place Value	SATS WEEK
WK 5	Operations	Operations	Y5 Reflection and translations
WK 6	Operations	Fractions	AfL Revision
WK 7	Statistics	Fractions (R&P)	AfL Revision
WK 8	Fractions	Fractions (R&P)	AfL Revision
WK 9	Fractions	Geometry	AfL Revision
WK 10	Fractions	SATS/RS Tests	Y5 RS Tests/Y6 investigations
WK 11	Measures	Y6 Mean / Y5 Geometry	
WK 12	SATS/RS tests	Statistics	
WK 13	Geometry		
Wk 14	AfL/Personalised target setting		

(Please Note – this is a flexible LTP and is subject to changes during the year due to other school/class commitments and AfL during lessons)

Beech Class – Mathematics Yearly Pacer

	Autumn	Spring	Summer
WK 1	Place Value and Ordering	Place Value (to include rounding and estimating)	Place Value (to include positive and negative numbers)
WK 2	Number Facts	Doubling and Halving	Factors and Multiples
WK 3	Addition	Addition	Addition & Subtraction
WK 4	Subtraction	Subtraction	Symmetry, Reflection, Rotation & Translations
WK 5	Doubles	Shape & Angles	Fractions & Proportion
WK 6	Halves/Fractions	Fractions & Decimals	Position and Direction
WK 7	2D Shape	Space and 3D Shape	Capacity
WK 8	Length (perimeter)	Weight	Time – 24-hour clock
WK 9	Time (to include Roman numerals)	Time (to include finding time intervals)	Multiplication
WK 10	Multiplication	Multiplication & Division	Assessments
WK 11	Assessments	Assessments	Division
WK 12	Division	Statistics – Organising Data	Statistics Collecting, Sorting and Using Data
WK 13	Statistics – Collecting Data		
Wk 14			

(Please Note – this is a flexible LTP and is subject to changes during the year due to other school/class commitments and AfL during lessons)

Willow Class – Mathematics Yearly Pacer

	Autumn	Spring	Summer
WK 1	Number and Place Value	Number and Place Value	Number & Place Value
WK 2	Number and Place Value	Number and Place Value	Number & Place Value
WK 3	Addition	Addition	Addition & Subtraction
WK 4	Subtraction	Subtraction	Geometry - Shape and Symmetry
WK 5	Doubles and Halves	Properties of Shape	Fractions
WK 6	Halves/Fractions	Fractions	Position and Direction
WK 7	Geometry - 2D Shape	Geometry - 3D Shape	Capacity
WK 8	Length	Weight	Time – 24-hour clock
WK 9	Time	Time	Multiplication
WK 10	Multiplication	Multiplication & Division	Assessments
WK 11	Assessments	Assessments	Division
WK 12	Division	Statistics (Y2) Time (Y1)	Statistics (Y2) Measures (Y1)
WK 13	Statistics (Y2) Position and Direction (Y1)		
Wk 14			

(Please Note – this is a flexible LTP and is subject to changes during the year due to other school/class commitments and AfL during lessons)

Iceni Academy Hockwold Mathematics Long Term Plan – Objectives Overview

Number and Place Value [N]

Black = revisiting each term Yellow = added in term 2, Blue = added in term 3

Y1	Y2	Y3	Y4	Y5	Y6
Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number e.g. *19, 18, 17, 16, …* 103, 102, 101, 100, 99, 98, … [N1.1] Count, read and write numbers to 100 in numerals, count in multiples of twos, fives and tens e.g. 5, 10, 15, 20, 25, … [N1.2] Given a number, identify one more and one less. [N1.3] Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least. [N1.4] Read and write numbers from 1 to 20 in numerals and words. [N1.5] Use language of ordering e.g. first, second, third. [N1.6] Begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100 supported by objects and pictorial representations.	Count in steps of 2, 3, and 5 from 0, and tens from any number, forward or backward. [N2.1] Recognise the place value of each digit in a two-digit number (tens, ones). [N2.2] Identify, represent and estimate numbers using different representations, including the number line. [N2.3] Read and write numbers to at least 100 in numerals and in words. [N2.4] Compare and order numbers from 0 up to 100; use <, > and = signs. [N2.5] Use place value and number facts to solve problems. [N2.6] Partition numbers in different ways e.g. 23 = 20 + 3 = 10 + 13. [N2.7]	Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number. [N3.1] Recognise the place value of each digit in a three-digit number (hundreds, tens, ones). [N3.2] Identify, represent and estimate numbers using different representations *including those related to measure*. [N3.3] *Apply partitioning related to place value using varied and increasingly complex problems.* [N3.4] Read and write numbers to at least 1000 in numerals and in words. [N3.5] Compare and order numbers up to 1000. [N3.6] Solve number problems and practical problems involving place value and rounding. [N3.7]	Count in multiples of 6, 7, 9, 25 and 1000. [N4.1] Find 1000 more or less than a given number. [N4.2] Count backwards through zero to include negative numbers [N.3c] Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones). [N4.4] Order and compare numbers beyond 1000. [N3.5] Identify, represent and estimate numbers using different representations including measures and measuring instruments. [N4.6] Round any number to the nearest 10, 100 or 1000. [N4.7] Solve number and practical problems that involve place value and rounding and with increasingly large positive numbers. [N4.8] Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value. e.g. 49 = XLIX. [N4.9]	Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit e.g. Order a set of multi-digit numbers from smallest to largest e.g. what is the smallest integer you can make using all of these digits: 8,1,0,5,6? What must be added to 37 500 to change it to 67 500? [N5.1] Count forwards or backwards in steps of powers of 10 from any given number up to 1,000,000. [N5.2] Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero. [N5.3] Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000. [N5.4] Solve number problems and practical problems that involve number, place value and rounding; e.g. What number is halfway between 560500 and 560600? What is the largest 4-digitnumber whose digits sum to 20? (9920) The distance to the bus stop is 1km to the nearest 100m; what is the shortest distance it could be? [N5.5]	Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit; e.g. What must be added to 26523 to change it to 54525? [N6.1] Round any whole number to a required degree of accuracy, e.g. round 265496 to the nearest 10000; give an example of a number which you might round to the nearest 10? Nearest 10000; what is the smallest number which rounds to 500 000, to the nearest 1000? (499 500). [N6.2] Use negative numbers in context, and calculate intervals across zero; e.g. how much warmer is 5C than -4C? [N6.3] Solve number and practical problems that involve number, place value and rounding e.g. what is the largest 5-digit number whose digits sum to 20? (99200) e.g. what is the smallest number which rounds to 35 000, to the nearest 1000? (34 500); what is the smallest 4-digit integer whose digits sum to 20? (10199). [N6.4]

Begin to order numbers to 100 (different tens) *e.g. order 36, 29, 63, 51*. [N1.7] Recognise odd and even numbers. [N1.8]				Recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule e.g. find the rule and complete the sequence: ___, 16, 8, 4, ___, 1, 0.5, ___ The distance to the bus stop is 1km to the nearest 100m;what is the shortest distance it could be? [N5.6] Read Roman numerals to 1000 (M) and recognise years written in Roman numerals. e.g. MCMXIV (1914) [N5.7]	

Iceni Academy Hockwold Mathematics Long Term Plan – Objectives Overview

Operations (Addition and Subtraction) [AS]

Black = revisiting each term Yellow = added in term 2, Blue = added in term 3

Y1	Y2	Y3	Y4	Y5	Y6
Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs. [AS1.1] Represent, *memorise* and use number bonds and related subtraction facts within 10, *in several forms e.g. 3 + 4 = 7; 4 = 7 – 3; and begin to know doubles to 20 e.g. 8 + 8 = 16 complements to 20 e.g. 8 + 12 = 20; within 20 e.g. 9 + 7 = 16; 16 – 7 = 9; 7 = 16 – 9*. [AS1.2] Add and subtract one-digit and two-digit numbers to 20, including zero. [AS1.3] Solve simple one-step problems *(in familiar practical contexts, including using quantities)* that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems, e.g. 3 + □ = 7 7 = □ – 9. [AS1.4] *Problems should include vocabulary such as: put together, add, altogether, total, take away, distance between, more than, less than…* [AS1.5]	Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: • a two-digit number and ones • a two-digit number and tens. • Two two-digit numbers • adding three one-digit numbers. [AS2.1] Solve problems with addition and subtraction: • using concrete objects and pictorial representations, including those involving numbers, quantities and measures • applying their increasing knowledge of mental and written methods. [AS2.2] Recall and use addition and subtraction facts to 20 fluently, *and derive and use related facts up to 100.* [AS2.3] Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems. [AS2.4] Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. [AS2.5]	Add and subtract numbers mentally, including: • a three-digit number and ones • a three-digit number and tens *e.g. 476 + 50* • a three-digit number and hundreds *e.g. 858 – 300* • *two-digit numbers where the answer could exceed 100 e.g. 99+18 68+47*. [AS3.1] Add and subtract numbers with up to three digits, using the efficient written methods of columnar addition and subtraction. [AS3.2] Estimate the answer to a calculation and use inverse operations to check answers. [AS3.3] Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction: e.g. 2 x ? = 7 x ? *There are 46 boys and 58 girls in Year 3, but 12 children are away; how many Year 3 children are at school? Investigate the numbers which could go in the boxes when* □3 - 2□ = □6. [AS3.4]	*Use both mental and written methods with increasingly large numbers to aid fluency e.g. mentally calculate 540 + 400 or 900 – 360 mentally calculate 540 + 270 or 900 – 365*. [AS4.1] Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. [AS4.2] Estimate and use inverse operations to check answers to a calculation. [AS4.3] Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why; *e.g. it costs £3.50 for Ben to go swimming and £5:70 for his mum; how much change is there from £10? investigate which amounts of money cannot be made using exactly three coins. Mr Smith sets out on a 619 mile journey; he drives 320 miles before lunch and 185 miles after lunch; how much farther does he need to drive?* [AS4.4]	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction). [AS5.1] Add and subtract numbers mentally with increasingly large numbers: eg. 15400 – 2000 = 13400 12462-2300 = 10162. [AS5.2] Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. [AS5.3] Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why: eg. I have read read 124 of the 526 pages of my book; how many more pages must I read to reach the middle? e.g. I bought some stickers on Monday; on Tuesday I bought 20 more than I bought on Monday; now I have 70; how many stickers did I buy on Monday? Write a number story for this sentence: 3709=4562+234-1087. [AS5.4]	*Continue to practise the four operations for larger numbers using the formal written methods of columnar addition and subtraction.* [AS6.1] Perform mental calculations, including with mixed operations and large numbers eg. (13500 x) ÷ 9 = 3000 (13,400 + 10600) x 4 ÷ 12 = 8000. [AS6.2] Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why eg. There are 6534 cars parked in a 3-storey car park; 1398 are on th first floor and 3765 are on the second floor; how many cars are parked on the third floor? e.g. Three people won £365496 on the lottery; one received $40010; how much did the third person receive? Write a number story for this number sentence: 23.5 =20.4+4.9 – 1.8. [AS6.3] Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy: e.g. find the perimeter of a football pitch with side lengths 105.3m and 46.8m; a box contains approx 52 matches; how many boxes can be filled with 10000 matches? [AS6.4]

	Use the language 'sum' and 'difference' *e.g. find two numbers with a difference of 6 (3 and 9, 10 and 16..);* *three numbers sum to 12, two numbers are 3 and 7, what is the third number?* [AS2.6]				Use their knowledge of the order of operations to carry out calculations involving the four operations *and using brackets eg. 2 + 1 x 3 = 5.* *14 x (29-12) +7 = 245.* [AS6.5]

Iceni Academy Hockwold Mathematics Long Term Plan – Objectives Overview

Operations (Multiplication and Division) [MD]

Black = revisiting each term Yellow = added in term 2, Blue = added in term 3

Y1	Y2	Y3	Y4	Y5	Y6

Double and halve numbers to 20 *e.g. double 6 is 12, half of 10 is 5;* *e.g. double 8 is 16, half of 20 is 10.* [MD1.1] Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher e.g. share 8 sweets between 2 children. [MD1.2]	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers. [MD2.1] Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs. [MD2.2] Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. [MD2.3] Recognise and use the inverse relationship between multiplication and division in calculations. [MD2.4] Relate multiplication and division to grouping and sharing discrete e.g. counters and continuous quantities e.g. water, and relating these to fractions and measures e.g. 40cm ÷ 2 = 20cm; 20cm is ½ of 40cm. [MD2.5] Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts *e.g. share 18 counters between 3 children;* *there are 10 pencils in a box, I have 5 boxes and 3 spare pencils, how many do I have altogether?* [MD2.6]	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. [MD3.1] Develop efficient mental methods, for example, using commutativity (*e.g. 2 × 7 × 5 = 2 × 5 × 7 = 10 × 7 = 70 4 × 12 × 5 = 4 × 5 × 12 = 20 × 12 = 240*) and multiplication and division facts to derive related facts *e.g. using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3 to derive 30 × 2 = 60, 60 ÷ 3 = 20 and 20 = 60 ÷ 3.* [MD3.2] Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental methods *e.g. 22×3* and progressing to formal written methods *34×5 or 64÷4 46×8 or 81÷3*. [MD3.3] Solve problems, including missing number problems, involving multiplication and division, including integer scaling problems: e.g. 90 = 3 x □ 240 = □ x 4 *change a recipe for 2 people to make enough for 6 people* . Correspondence problems in which n objects are connected to m objects. *e.g. 3 hats and 4 coats, how many different outfits? Or Share 6 cakes equally between 4 children.* [MD3.4]	Recall multiplication and division facts for multiplication tables up to 10 x 10 up to 12 × 12. [MD4.1] Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. [MD4.2] Multiply two-digit and three-digit numbers by a one-digit number using formal written layout. [MD4.3] Recognise and use factor pairs and commutativity in mental calculations. [MD4.4] *Use the formal written method for short division with exact answers when dividing by a one-digit number e.g. 456 ÷ 3 736 ÷ 8.* [MD4.5] Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects: *e.g. 3 skirts and 4 tops, how many different outfits?* *the number of different choices on a menu* *3 cakes shared equally between 10 children.* [MD4.6]	Continue to practise and apply multiplication tables and related division facts, committing them to memory and using them confidently to make larger calculations. [MD5.1] Identify multiples and factors, including finding all factor pairs of a number and common factors of two numbers. [MD5.2] Solve problems involving multiplication and division where larger numbers are used by decomposing them into their factors. [MD5.3] Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. [MD5.4] Establish whether a number up to 100 is prime and recall prime numbers up to 19. [MD5.5] Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers. [MD5.6] Multiply and divide numbers mentally drawing upon known facts: Eg. 60x9. Eg. 630÷9.Eg 840÷12. [MD5.7] Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. [MD5.8] Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret	*Continue to use all the multiplication tables to 12 × 12 in order to maintain their fluency.* [MD6.1] *Continue to practise the four operations for larger numbers using the formal written methods short and long multiplication, and short and long division.* [MD6.2] Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. [MD6.3] Perform mental calculations, including with mixed operations and large numbers. [MD6.4] Solve problems involving multiplication and division. [MD6.5] Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy: eg. 396 children and 37 adults went on a school trip; buses seat 57 people; how many buses were needed? I think of a number and subtract 5.6 from it then multiply the result; the answer is 7.2; what was my number? Club A sold 3500 tickets for £9.50 each and Club B sold 8150 tickets for £3.50; how much more money did Club A make than Club B? [MD6.6] Identify common factors, common multiples and prime numbers: eg. Common factors of 12 and 15 are 1 and 3; e.g. find the smallest common

				remainders appropriately for the context. [MD5.9] Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}). [MD5.10] Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign: eg. 40x8=500 - ? There are 6 shelves of books; 3 shelves hold 35 books each, one shelf holds 45 and the top two shelves have the same number of books on each; there are 200 books altogether; how many books are on the very top shelf? [MD5.11] Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates, eg. A toymaker can make 8 toys in 2 hours; how many toys can he make in 5 hours? [MD5.12]	multiple of 5, 6 and 8 (120). Find the highest common factor of 120 ,90 and 75. [MD6.7] Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. *See addition and subtraction for examples.* [MD6.8] Use their knowledge of the order of operations to carry out calculations involving the four operations *and using brackets. See addition and subtraction for examples.* [MD6.9]

Iceni Academy, Hockwold
KS1 Calculation Policy p1

Addition

Use of models and images:

Number lines:

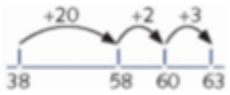
Bar models (physically with multi-link etc)

7	
5	2

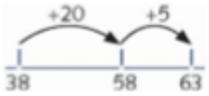
Adding two multiples of 10:

30	
10	20

Using an empty number line:



LEADING TO:



Subtraction

Concrete objects/pictorial representations:

Number lines:

* Start from larger number and count down

Bar models (physically with multi-link etc)

7	
5	2

Number families—the inverse relationship between addition and subtraction:

5 + 2 = 7

2 + 5 = 7

7—2 = 5

7—5 = 2

Multiplication and Division

Use of models and images:

Arrays (and commutativity):

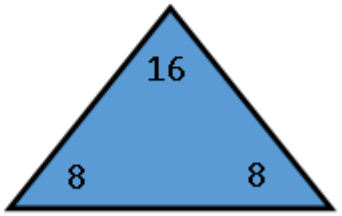
4 x 5 = 20

5 x 4 = 20

20 ÷ 5 = 4

20 ÷ 4 = 5

Doubles and halves to 20:



* Double 8 = 16

* Half of 16 = 8

Vocabulary

Number bonds to 10:

Eg. 4 + 6 = 10

Number bonds to 20:

Eg. 13 + 7 = 20

Commutativity:

3 + 4 = 4 + 3

3 x 4 = 4 x 3

Inverse:

3 x 2 = 6

6 ÷ 2 = 3

Place Value:

HTO stands for Hundreds, Tens, Ones

Multiples of 2, 5 and 10:

Eg. Multiples of 5 are 5, 10, 15, 20 etc

Using the language of:

- Equal to
- More than
- Less than (fewer)
- Most
- Least

Iceni Academy, Hockwold
KS1 Calculation Policy p2

Addition

Partitioning into tens and ones:

		3	8	+	2	5		
3	0	+	8		2	0	+	5

Expanded written method if ready:

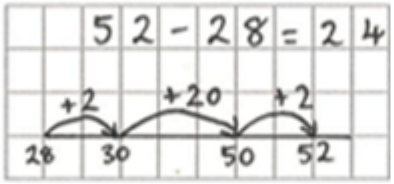
	3	0		8				
	2	0		5				
+	5	0		3	=	6	3	
	1	0						

Using a 1 - 100 square

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Subtraction

Finding the difference by counting down:



Subtract a near multiple of 10:

Eg. 20—9 could be done as 20-10 + 1

Using partitioning if ready:

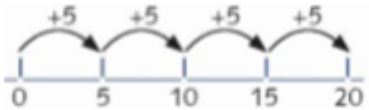
8	7	-	3	2	=	5	5		
	8	0		7					
	3	0		2					
	5	0		5					

Using a 1 - 100 square

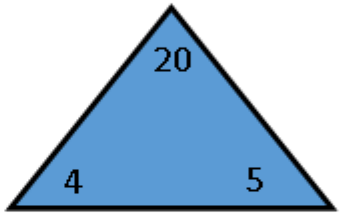
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiplication and Division

Multiplication is repeat addition:



Trios:



Multiplication and division table:

x	2	5	10
1	2	5	10
2	4	10	20
3	6	15	30
4	8	20	40
5	10	25	50
6	12	30	60
7	14	35	70
8	16	40	80
9	18	45	90
10	20	50	100
11	22	55	110
12	24	60	120

Vocabulary

Inverse relationship between doubling and halving:

Half of 20 is 10

Double 10 = 20

Multiples of 2, 5 and 10:

Eg. Multiples of 5 are 5, 10, 15, 20 etc

Using the language of:

< > =

Using the signs:

+ - x ÷

Columns:

Lining columns up with their correct place value—tens and ones.

			T	0					
			4	7					
(f	o	r	t	y-	s	e	v	e	n)

Odd and even numbers:

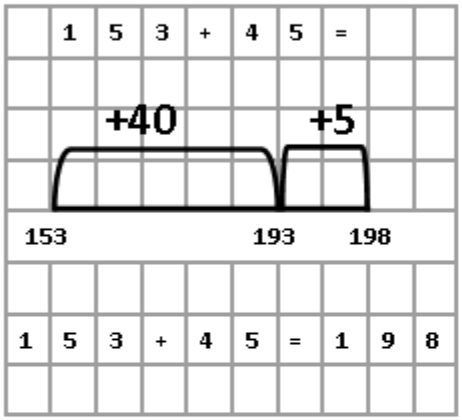
Odd are 1, 3, 5, 7, 9 etc

Even are 2, 4, 6, 8, 10 etc

Iceni Academy, Hockwold
KS2 Calculation Policy p3

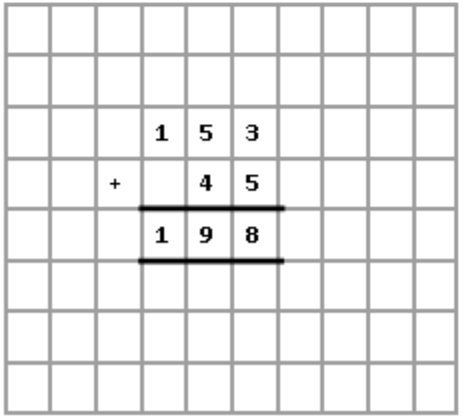
Addition

Using a number line:



* Count on from the smaller number
* Add the jumps together

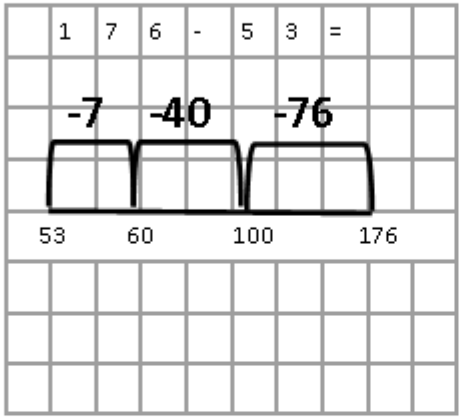
Column addition—no carrying:



* Start with the Ones column

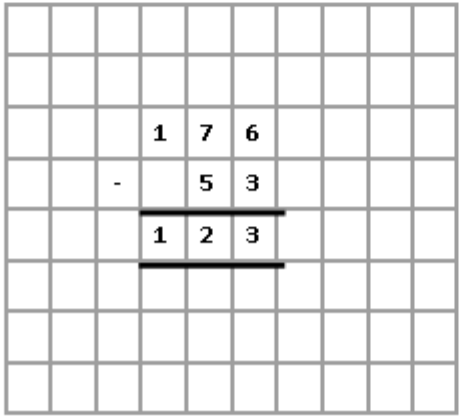
Subtraction

Using a number line:



* Count back from the larger number
* Add the jumps together

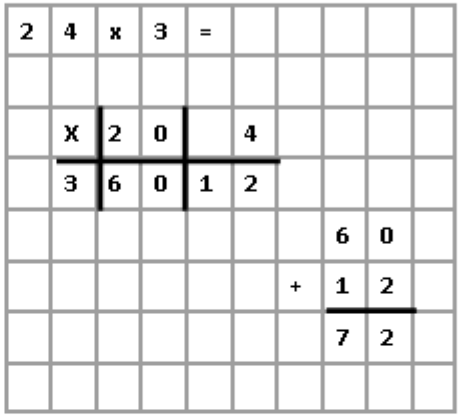
Column subtraction—no decomposition:



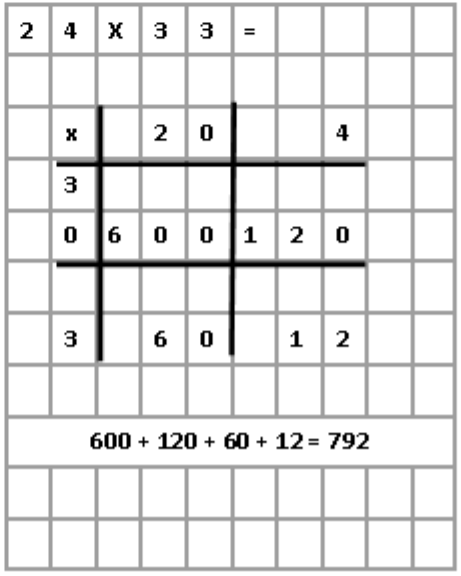
* Start with the Ones column

Multiplication

Grid method—2 digit x 1 digit:

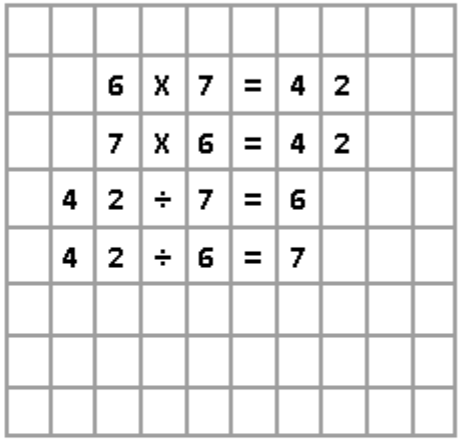


Grid method—2 digit x 2digit:

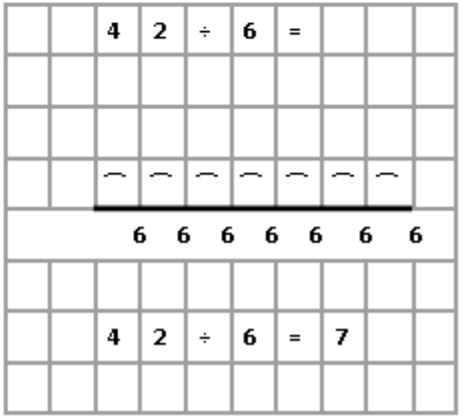


Division

Identifying division as the inverse of familiar times table families of numbers:



Using a number line for repeated addition:



* How many jumps are there?

Iceni Academy, Hockwold
KS2 Calculation Policy p4

Addition

Bridging 10 and 100 with carrying:

	1	5	3	+	2	5	8	=	
		1	5	3					
	+	2	5	8					
		4	1	1					
		1	1						

Column addition with larger numbers:

		3	4	0	9				
	+		2	6	8				
		3	6	7	7				
				1					

* Setting up sums with correct Place Value is extremely important.

Subtraction

Column subtraction—with decomposition:

	1	5	3	-	7	6	=		
			14	1					
	0	~~1~~	~~5~~	3					
	-		7	6					
			7	7					

Column subtraction with larger numbers:

			3	1					
		3	~~4~~	0	9				
	-		2	6	8				
		3	1	4	1				

* Setting up sums with correct Place Value is extremely important.

Multiplication

Long multiplication—2 digit x 1 digit:

		2	4	x	3	=			
			2	4					
		x		3					
			7	2					
			1						

* Carrying under the correct column—small

Multiplying (and dividing) by 10 and 100:

		Th	H	T	O				
				2	4				
		2	4	0	0				
2	4	X	1	0	0	=			

* Count the zeros to know how many Place Value columns to jump

Division

'Bus stop' without remainders:

		7	2	÷	3	=			
				2	4				
			3	7	2				

'Bus stop' with remainders:

		7	3	÷	3	=			
				2	4	r	1		
			3	7	3				

Iceni Academy, Hockwold
KS2 Calculation Policy p5

Addition

Column addition with decimals—Beech:

	3	.	7	+	0	.	8	
		3	.	7				
	+	0	.	8				
		4	.	5				
		1						

* In Beech Class decimal points will occupy their own space

Column addition with decimals—Oak:

	3	●	7	4	+	0	●	8
		3	●	7	4			
	+	0	●	8				
		4	●	5	4			
		1						

* This layout extends into using money and measures across all four operations

Subtraction

Column subtraction with 0 as a place holder:

				5	16	1		
		5	4	~~6~~	~~7~~	0		
	-			3	9	9		
		5	4	2	7	1		

Column subtraction with decimals:

	3	●	6	-	1	●	2	4
					5	1		
			3	●	~~6~~	0		
		-	1	●	2	4		
			2	●	3	6		

* As with addition, Beech Class decimal points will occupy their own space.

* A zero must be add as a place holder where one does not exist

Multiplication

Long multiplication—3 digit x 2 digit:

		3	2	9				
X		2	2					
	6	5	8					
6	5	8	0					
7	2	3	8					
1	1							

Multiplying (and dividing):

X 10	X 100	X 1,000
÷ 10	÷ 100	÷ 1,000

Millions			Thousands			Hundreds			
H	T	O	H	T	O	H	T	O ●	t
								2 ●	3
						2	3	0 ●	0
2 ●	3	X	1	0	0	=	2	3	0

Division

'Bus stop' with decimal remainders:

		6	6	5	÷	2	=	
			3	3	4 ●	5		
		2	6	6	5 ●	0		

Double digit 'bus stop' division with continuous 'sandwich' addition:

9	5	2	÷	1	7	=		
		0	5	6		1x	1	7
1	7	9	9 5	10 2		2x	3	4
						3x	5	1
						4x	6	8
						+	1	7
						5x	8	5
						+	1	7
						6x	1 0	2

Iceni Academy, Hockwold
KS2 Calculation Policy p6

Additional notes regarding calculations:

* One digit goes in each square
* We use 'Hundreds, Tens and Ones' - not Units
* An 'HTO' grid in Beech Class looks like this:

Th	H	T	O •	1/10

* In Oak it looks like this:
* Children should speak the numbers as follows:

"Twelve million, three hundred and forty-eight thousand, seven hundred and six"

Millions			Thousands			Hundreds					
H	T	O	H	T	O	H	T	O •	t	h	th
	1	2	3	4	8	7	0	6			

* Please see separate Fractions Policy under construction April 2021

Multiplication

Long multiplication with decimals:

4 •	6	×	3 •	2					
×	10		×	10					
4	6		3	2				4	6
							×	3	2
A	1	4 •	7	2				9	2
						1	3	8	0
						1	4	7	2
							1		
1	4	7	2	÷	1	0	0		

* Multiply by 10, 100 or 1,000 to 'get rid' of the decimals
* Then do a 'normal' long multiplication
* Do not forget to divide by 10, 100 or 1,000 at the end to convert back

Division

Long division:

			0	1	7				
	2	5	4	2	5				
		-	0	↓	↓				
			4	2					
		-	2	5					
			1	7	5				
		-	1	7	5				
			0	0	0				

* Order of actions help box:

÷
x
-
↓

Special Terms

BIDA (DM & AS **MS** interchange)	BIDMAS—the order of operations	Squared number Eg. 3x3	Shown as 3^2	Factor = what we multiply to get a number, eg. 2 x 3 = 6 so 2 and 3 are factors of 6
				Multiple = what we get after multiplying, eg. 2 x 6 = 12 so 12 is a multiple of 2 and 6.
Area formula	l x w =	Cubed number Eg. 3x3x3	Shown as 3^3	Prime number = a number divisible only by 1 and itself (2, 3, 5, 7, 11 etc)
Volume formula	l x w x h =			Integer = whole number

Iceni Academy Hockwold Mathematics Long Term Plan – Objectives Overview

Measures [M]

Black = revisiting each term Yellow = added in term 2, Blue = added in term 3

Y1	Y2	Y3	Y4	Y5	Y6
Compare, describe and solve practical problems for: • lengths and heights *(e.g. long/short, longer/shorter, tall/short, double/half)* • mass or weight *(e.g. heavy/light, heavier than, lighter than)* • capacity/volume *(full/empty, more than, less than, quarter)* • time *(quicker, slower, earlier, later)*. [M1.1] *Use non standard measures to* measure and begin to record the following: • lengths and heights • mass/weight • capacity and volume • time (hours, minutes, seconds). [M1.2] Recognise and know the value of different denominations of coins and notes. [M1.3] Sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening. [M1.4] Recognise and use language relating to dates, including days of the week, weeks, months and years. [M1.5]	Choose and use appropriate standard units to estimate and measure: length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels. [M2.1] Compare and order lengths, masses, volume/capacity and record the results using >, < and = . [M2.2] Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value *e.g. make 73p using the fewest coins*. [M2.3] Find different combinations of coins to equal the same amounts of money. [M2.4] Solve simple problems in a practical context involving addition and subtraction of money of the same unit including giving change *e.g. I buy a toy for £14; how much change do I get from £20?* *I buy 2 bags of sweets for 20p each, how much change will I get from 50p?* *I buy a cake for 60p and a biscuit for 25p, how much change will I get from £1?* [M2.5]	Measure, compare, add and subtract: length (m/cm/mm); mass (kg/g) volume and capacity (l/ml) *e.g. how much ribbon is left when 36cm is cut from 1m? Which is longer: 6½cm or 62mm? 5m or 450cm? Measure and draw lines to the nearest ½ cm. Know the approximate length of a book, a room, a handspan…* *find 3 vegetables which weigh between 100g and 300g. Read 250g on a scale labelled every 100g. Which is heavier: 1kg 300g or 1½kg? Know the approximate mass of a book, an apple, a baby, a man…* *Read 300ml on a scale labelled every 200ml. Order a set of containers by capacity, using a measuring jug and water to check. Know the approximate capacity of a cup, a jug, a bucket…* [M3.1] Measure the perimeter of simple 2-D shapes *e.g. measure accurately the sides of a triangle in cm or mm, in order to find the perimeter.* [M3.2] Add and subtract amounts of money to give change, using both £ and p in practical contexts *e.g. I buy2 packs of sweets for 75p each; how much change will I get from £2? I have a £2 coin, two £1 coins, three 50p coins, a 20p and*	Convert between different units of measure *e.g. 4½kg = 4500g; 90 minutes = 1½ hours*. [M4.1] Estimate, compare and calculate different measures, including money in pounds and pence *e.g. put in order: £1.20, 98p, £0.89, £1.08 put in order: 4.2kg, 4700g, 4½kg, 490g*. [M4.2] Read, write and convert time between analogue and digital 12 and 24-hour clocks. [M4.3] Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to day *e.g. which of these children are 3 years old: Isabel 39 months; Ben 32 months; Cara 50 months; Dylan 42 months ?* [M4.4] Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres *e.g. find the perimeter of an L-shape where the lengths are given or can be measured.* [M4.5] Find the area of rectilinear shapes by counting squares *e.g. find the area of an L-shape drawn on squared paper.*	Convert between different units of measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre): eg. 15.7cm = 157mm. Eg. 3.7l = 3700ml 2.2m = 2200mm. [M5.1] Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres: find the perimeter of an L shape where one or two side lengths are not given; e.g. given the perimeter and length of a rectangle, calculate its width. [M5.2] Calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes: eg. Investigate possible rectangles with the same area as a particular square. [M5.3] Estimate volume *e.g. using 1cm³ blocks to build cubes and cuboids* and capacity *e.g. using water*. [M5.4] Solve problems involving converting between units of time e.g. Write these lengths	Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places. [M6.1] Recognise that shapes with the same areas can have different perimeters and vice versa: eg. Investigate rectangles with area of 24cm² and has the same area as a square with side length 8cm e.g. investigate triangles with areas of 12cm² to find which has the smallest perimeter. Investigate parallelograms with areas of 24cm² to find which has the smallest perimeter. [M6.2] Recognise when it is possible to use formulae for area and volume of shapes: eg. Find the length of rectangle which is 4m wide and has the same area as a square with a side length of 8cm e.g. find the length of the side of a cube with a volume of 27cm³. Find the height of a cuboid which is 12cm long, 2cm high and has the same volume as a cube with sides of 6cm. [M6.3] Calculate the area of parallelograms and triangles,

Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. [M1.6]	Compare and sequence intervals of time. [M2.6] Tell and write the time to five minutes, including o'clock, half-past; quarter past/to the hour and draw the hands on a clock face to show these times. [M2.7]	*seven 5p coins; how much more do I need to make £10? Ali is saving 80p each week, to buy a toy costing £5; how many weeks will it take him?* [M3.3] Tell and write the time from an analogue clock *e.g. draw hands on a clock face to show 'ten to four', making sure the hour hand is located correctly,* including using Roman numerals from I to XII, and 12-hour and 24-hour *digital* clocks. [M3.4] Estimate and read time with increasing accuracy to the nearest minute; record and Compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight. [M3.5] Compare durations of events, for example to calculate the time taken by particular events or tasks. [M3.6] Know the number of seconds in a minute and the number of days in each month, year and leap year. [M3.7]	[M4.6]	of time in order, starting with the smallest: 250sec, 90min,1/2 hour, 4min *e.g. three children share a trophy for 8 weeks and 4 days; they each have it for the same length of time; how long does each child keep the trophy?* [M5.5] Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling. [M5.6] *Calculate the area of scale drawings using given measurements. e.g. calculate the area of a 5cm × 3cm garden on a scale drawing with a scale 1cm:2m (60m^2).* [M5.7] Understand and use equivalences between metric and common imperial units such as inches, pounds and pints *e.g. Given that an inch is approximately 2.5cm, calculate the metric equivalent of a foot (12 inches)*. [M5.8]	*relating it to the area of rectangles*. [M6.4] Solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate. [M6.5] convert between miles and kilometres *and other units commonly used*. [M6.6] calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3) and extending to other units, such as mm^3 and km^3. [M6.7] *Begin to use compound units for speed e.g. miles per hour.* [M6.8]

Iceni Academy Hockwold Mathematics Long Term Plan – Objectives Overview

Geometry [G]

Black = revisiting each term Yellow = added in term 2, Blue = added in term 3

Y1	Y2	Y3	Y4	Y5	Y6
Properties of Shape					
Recognise and name common 2-D and 3-D shapes, *in different orientations and sizes*, including: • 2-D shapes *(e.g. rectangles (including squares), circles and triangles)* • 3-D shapes *(e.g. cuboids (including cubes), pyramids and spheres).* [G1.1] *Know that rectangles, triangles, cuboids and pyramids can be different shapes.* [G1.2]	Identify and describe the properties of 2-D shapes, including the number of sides and symmetry in a vertical line. [G2.1] *Draw lines and shapes using a straight edge.* [G2.2] Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces. [G2.3] Compare and sort common 2-D and 3-D shapes and everyday objects : *e.g. sort 3-D shapes in different ways such as whether they have triangular faces, all straight edges…* *sort 3-D shapes in different ways such as whether they are prisms, whether they have more than 8 edges…* *sort 2-D shapes in different ways such as whether they are quadrilaterals and have line symmetry….* [G2.4] *Recognise and name quadrilaterals, polygons e.g. pentagon, hexagon, octagon, prisms and cones.* Identify 2-D shapes on the surface of 3-D shapes, for example a circle on a cylinder	Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations; and describe them *e.g. number of faces, edges and vertices (singular: vertex), e.g. guess my shape: it has a square face and four triangular faces (square-based pyramid).* [G3.1] Recognise that angles are a property of shape or a description of turn. [G3.2] Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle. [G3.3] *Describe the properties of shapes using accurate language, including symmetrical/not symmetrical, lengths of lines, and acute and obtuse angles e.g. sort triangles into those with an obtuse angle and those without.* [G3.4] Identify horizontal and vertical lines and pairs of perpendicular and parallel lines. [G3.5]	Compare and classify geometric shapes, including quadrilaterals *(e.g. parallelogram, rhombus, trapezium)* and triangles *(e.g. isosceles, equilateral, scalene)*, based on their properties and sizes : *e.g. sort triangles to find those that are isosceles and/or have a right angle* *sort quadrilaterals to find those with line symmetry or parallel edges.* [G4.1] Complete a simple symmetric figure with respect to a specific line of symmetry. [G4.2] Identify acute and obtuse angles and compare and order angles up to two right angles by size, *without using a protractor.* [G4.3] *Compare lengths and angles to decide if a polygon is regular or irregular. e.g. regular polygons have edges with the same lengths and angles all the same size e.g. a square is the only regular quadrilateral.* [G4.4] Identify lines of symmetry in 2-D shapes presented in different orientations. [G4.5]	Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. [G5.1] *Draw lines accurately to the nearest millimetre and use conventional markings for parallel lines and right angles.* [G5.2] Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. [G5.3] Draw given angles, and measure them in degrees (°).[G5.4] Identify: • angles at a point and one whole turn (total 360°) • angles at a point on a straight line and ½ a turn (total 180°) • other multiples of 90°. [G5.5] *Use angle sum facts and other properties to make deductions about missing angles.* [G5.6] Use the properties of rectangles to deduce related facts and find missing lengths and angles *e.g. all angles are right angles, diagonals are congruent (same length) and bisect each other (divide into two equal parts), one diagonal separates the rectangle into*	Draw 2-D shapes using given dimensions and angles *using measuring tools and conventional markings and labels for lines and angles: e.g. construct a triangle or complete a parallelogram with given lengths and angles.* [G6.1] Recognise, describe and build simple 3-D shapes, including making nets. [G6.2] Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons. [G6.3] Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles *describing them algebraically e.g. a=180-(b+c).* [G6.4] Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius *describing it algebraically as d=2×r.* [G6.5]

	and a triangle on a pyramid. [G2.5]			*two congruent triangles…* [G5.7] *Use the term diagonal and make conjectures about the angles formed by diagonals and sides, and other properties of quadrilaterals, e.g. using dynamic geometry ICT tools.* [G5.8] Distinguish between regular and irregular polygons based on reasoning about equal sides and angles *e.g. sort triangles and quadrilaterals into regular and irregular sets, realising that only the equilateral triangles and the squares are regular.* [G5.9]	
Position and Direction					
Describe positions, directions and movements using language such as left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside… [G1.3] Describe position, directions and movements, including half, quarter and three-quarter turns, *in a clockwise direction.* [G1.4]	Order and arrange combinations of mathematical objects in patterns, *including those in different orientations.* [G2.6] Use mathematical vocabulary to describe position, direction and movement, including distinguishing between rotation As a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise), and movement in a straight line. [G2.7] *Use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts (e.g. pupils themselves moving in turns, giving instructions to other pupils to do so, and programming robots using instructions given in right angles).* [G2.8]		Describe positions on a 2-D grid as coordinates in the first quadrant. [G4.6] Plot specified points and draw sides to complete a given polygon *e.g. find the coordinates of the missing vertex of a shape.* [G4.7] Describe movements between positions as translations of a given unit to the left/right and up/down. [G4.18]	Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed. [G5.10]	Describe positions on the full coordinate grid (all four quadrants). [G6.6] Draw and translate simple shapes on the coordinate plane, and reflect them in the axes. [G6.7] *Predict missing coordinates of quadrilaterals by using the properties of shapes, which may be expressed algebraically, e.g. translating vertex (a, b) to (a-2, b+3), or find the other vertices of a square, given two of them are (a, b) and (a+d, b+d).* [G6.8] *Draw and label a pair of axes in all four quadrants with equal scaling.* [G6.9]

Iceni Academy Hockwold Mathematics Long Term Plan – Objectives Overview

Statistics (Y2 – Y6) [S]

Black = revisiting each term Yellow = added in term 2, Blue = added in term 3

Y2	Y3	Y4	Y5	Y6
Interpret and construct simple pictograms *e.g. where the symbol represents 2, 5 or 10 units*, tally charts, block diagrams and simple tables. [S2.1] Answer simple questions by counting the number of objects in each category and sorting the categories by quantity. [S2.2] Answer questions about totalling and comparing categorical data. [S2.3]	Interpret and present data using bar charts, pictograms and tables, *understanding and using simple scales e.g. 2, 5, 10 units per cm with increasing accuracy.* [S3.1] Solve one-step and two-step questions such as 'How many more?' and 'How many fewer?' using information presented in scaled bar charts and pictograms and tables. [S3.2] *Interpret data presented in many contexts.* [S3.3]	Interpret and present discrete data using appropriate graphical methods, including bar charts, *using a greater range of scales …* and continuous data using appropriate graphical methods, including bar charts and time graphs, *using a greater range of scales e.g. height of a sunflower plant, measured daily for 2 weeks.* [S4.1] Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. . [S4.2]	Complete, read and interpret information in tables, including timetables. . [S5.1] Solve comparison, sum and difference problems using information presented in line graphs. [S5.2] *Connect work on coordinates and scales to their interpretation of time graphs.* [S5.3] *Begin to decide which representations of data are most appropriate and why.* [S5.4]	Calculate and interpret the mean as an average. [S6.1] Interpret and construct pie charts and line graphs and use these to solve problems. [S6.2] *Encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects.* [S6.3]

Iceni Academy Hockwold Mathematics Long Term Plan – Objectives Overview

Ratio and Proportion (Y6 only) [RP]

Black = revisiting each term Yellow = added in term 2, Blue = added in term 3

- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts *e.g. adjust a recipe for 4 people, to serve 20 people e.g. adjust a recipe for 4 people, to serve 6 people e.g. adjust a recipe for 6 people, to serve 15 people*. [RP6.1]

- Solve problems involving similar shapes where the scale factor is known or can be found *e.g. two rectangular picture frames are the same shape, but one is bigger than the other; the smaller one measures 10cm by 15cm; the larger frame has a width of 30cm, what is its length? On a map 2cm represents 1km; a road measures 7cm on the map, how long is it in real life?* [RP6.2]

- *Use the notation a : b to record ratio.* [RP6.3]

- Solve problems involving the calculation of percentages (e.g. measures) such as 15% of 360 and the use of percentages for comparison. [RP6.4]

- *Link percentages of 360° to calculating angles of pie charts.* [RP6.5]

- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples *On a map 2cm represents 1km; a road measures 7cm on the map, how long is it in real life?* [RP6.6]

  e.g. the ratio of boys to girls in class 6 is 1:2; there are 8 boys, how many girls are there?.

Iceni Academy Hockwold Mathematics Long Term Plan – Objectives Overview

Algebra (Y6 only) [A]

Black = revisiting each term Yellow = added in term 2, Blue = added in term 3

- *Use symbols and letters to represent variables and unknowns in mathematical situations..*
    - *missing numbers, lengths, coordinates and angles*
        - *e.g. 3x=24 or the angles in a triangle are 35°, 120° and y°; find y*
        - *mathematics and science formulae e.g. A=l×w*
        - *arithmetic rules e.g. a+b=b+a*
        - *e.g. 5y+1=16 or the angles in an isosceles triangle are 50°, y° and y°; find y*
        - *e.g. 68=6t-4 or the angles in a kite are x°, x°, 15° and 53°; find x, or plot points (x, y) where x+y=10.* [A1.1]
    - *mathematics and science formulae e.g. A=l×w P=2(l+w) e.g. A=½(l×h).* [A1.2]
    - *arithmetic rules e.g. a+b=b+a a×b=b×a .* [A1.3]
    - *generalising number patterns e.g. 3, 6, 9, 12, … 3n 6, 11, 16, 21, … 5n+1.* [A1.4]
    - *number puzzles e.g. a+b=8.5 and a×6=15; find a and b x+y=10 and 2x+y=13; find x and y.* [A1.5]
- Express missing number problems algebraically *e.g. 17 = x + 4.5 the perimeter of a triangle is 20cm; it has two sides of length 8cm; what is the length of the other side? (20=2×8+x so x=4cm) I'm thinking of a number; I double it and subtract 12 from the result; the answer is 60; what was my number? (2x-12=60, so 2x=72, so x=36).* [A1.6]
- Use simple formulae expressed in words *e.g. write a formula for the number of months, m, in y years. (y=12m) write a formula for the cost of a party, C, which costs £100 plus £2 per person, n. (C=100+2n) write a formula for the cost of a taxi journey, C, which is £2.10 plus £1.60 per kilometre, k. (C=2.10+1.60k).* [A1.7]
- Enumerate all possibilities of combinations of two variables *e.g. investigate how many different ways 2 red eggs can be placed in a 6-space egg carton, by starting with a 3-space carton, 4-space carton etc? investigate all possible half-time scores when the full time score of a football match is 4:2 list all the combinations of boys and girls in a class where there are twice as many boys as girls and between 25 & 35 children in the class altogether.* [A1.8]
- Generate and describe linear number sequences *e.g. write the first 5 terms in a 'decrease by 9' sequence starting from 20, or find the nth term of a simple sequence e.g. 4, 8, 12, 16, … 4n 6, 13, 20, 27, … 7n-1* . [A1.9]
- Find pairs of numbers that satisfy number sentences involving two unknowns. *e.g. a – b = 5, give pairs of values that a and b could have. e.g. a – b = 5, give pairs of values that a and b could have (e.g. 8, 3 or 6.5, 1.5 or …) or. p×q=24; if p and q are both positive, even numbers, list all the possible combinations (e.g. 2×12, 4×6, …) . a – b = 5, give pairs of values that a and b could have (e.g. 8, 3 or 6.5, 1.5 or …)* . [A1.10]

Iceni Academy Hockwold Mathematics Long Term Plan – Objectives Overview

Fractions (including decimals Y3-Y6) [F]

Black = revisiting each term Yellow = added in term 2, Blue = added in term 3

Y1	Y2	Y3	Y4	Y5	Y6
Recognise, find and name a half as one of two equal parts of an object, shape, length or quantity *e.g. Find half of a length of string, by folding;.* *What is half of 12 counters?* [F1.1] Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity: *e.g. find a quarter of a shape, by folding in half and half again;* *find $\frac{1}{4}$ of 12 beads, practically.* [F1.2]	Recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity. [F2.1] Write simple fractions and recognise the equivalence of two quarters and one half. [F2.2] *Count in fractions.* *e.g. 0, $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, …* *e.g. $3\frac{1}{4}$, $3^2/_4$, $3\frac{3}{4}$, 4, $4\frac{1}{4}$, …* [F2.3]	Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 *e.g. 3 cakes shared between 10 children gives $^3/_{10}$ each.* [F3.1] *Connect tenths to place value e.g. $^7/_{10}$ = 0.7and decimal measures and to division by 10 e.g. $^{13}/_{10}$ = 1.3.* [F3.2] Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators *e.g. $^{13}/_{10}$ = 1.3 there are 8 marbles and three of them are red; what fraction of the marbles are red?* *find $^4/_5$ of 30.* [F3.3] *Understand the relation between unit fractions as operators (fractions of), and division by integers.* [F3.4] Recognise and use fractions as numbers *on the number line:* unit fractions and non-unit fractions with small denominators. [F3.5] Recognise and show, using diagrams, equivalent fractions with small denominators. [F3.6] Add and subtract fractions with the same denominator within one whole *e.g. If $^1/_3$ of a cake is eaten then $^2/_3$ remains or $^5/_7 + ^1/_7 = ^6/_7$.* [F3.7] Compare and order unit fractions, and fractions with the same denominators	Know that decimals and fractions are different ways of expressing proportions. [F4.1] Recognise and show, using diagrams, families of common equivalent fractions. [F4.2] Count using simple fractions and decimal fractions, both forwards and backwards and represent fractions and decimals on a number line. [F4.3] Count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten *e.g. $^3/_{10} = ^{30}/_{100}$ = 0.30 = 0.3.* [F4.4] Identify, name and write equivalent fractions of a given fraction, including tenths and hundredths. [F4.5] Add and subtract fractions with the same denominator. [F4.6] Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number. [F4.7]	*Know that percentages, decimals and fractions are different ways of expressing proportions.* [F5.1] *Count forwards and backwards in fractions and decimals bridging zero.* [F5.2] Compare and order fractions whose denominators are all multiples of the same number. [F5.3] Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths *and extending to thousandths, making links to decimals and measures.* [F5.4] *Read and write decimals as fractions.* [F5.5] *Connect fractions >1 to division with remainders,* [F5.6] Recognise mixed numbers and improper fractions and convert from one form to the other. [F5.7] Add and subtract fractions with the same denominator and multiples of the same number. [F5.8]	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. [F6.1] *List equivalent fractions to identify fractions with common denominators.* [F6.2] Compare and order fractions, including fractions >1. [F6.3] Associate a fraction with division and calculate decimal fraction equivalents. [F6.4] *Use understanding of relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity.* [F6.5] Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. [F6.6] *Use a variety of images to support understanding of multiplication with fractions.* [F6.7] Multiply simple pairs of proper fractions, writing the answer in its simplest form. [F6.8]

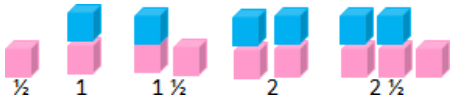
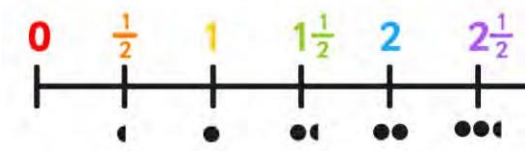
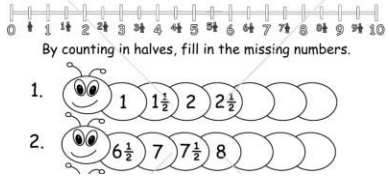
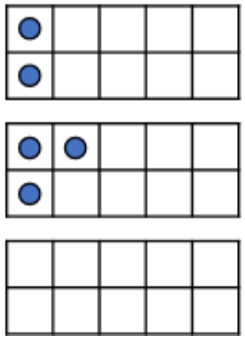
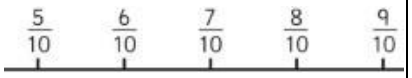
		e.g. put in order $^3/_8$, $^1/_8$, $^7/_8$, $^5/_8$ put in order $^1/_2$, $^1/_8$, $^1/_4$, $^1/_6$. [F3.8] Solve problems that involve fractions *e.g. Amy ate $\frac{1}{4}$ of her 12 sweets and Ben ate $\frac{1}{2}$ of his 8 sweets, who ate more sweets? Ali, Ben and Cara have 24 fish. $^2/_3$ of them belong to Ali, $\frac{1}{4}$ belong to Ben and the rest belong to Cara; how many fish belong to Cara?* [F3.9]	Recognise and write decimal equivalents of any number of tenths or hundredths. [F4.8] Recognise and write decimal equivalents to $^1/_4$; $^1/_2$; 3/4. [F4.9] Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths. [F4.10] Round decimals with one decimal place to the nearest whole number. [F4.11] Compare numbers with the same number of decimal places up to two decimal places *e.g. put in order: 2.56, 26.52, 2.65, 25.62, 2.62.* [F4.12] Solve simple measure and money problems involving fractions and decimals to two decimal places *e.g. two parcels weigh 5.5kg altogether, one weighs 3.8kg, what is the mass of the other? Ben buys a toy costing £4.55 and $\frac{1}{4}$ kg of sweets costing £3.20 per kilo; how much change does he receive from £10?* [F4.13]	*Find fractions of numbers and quantities.* [F5.9] *Connect multiplication by a fraction to using fractions as operators.* [F5.10] Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. [F5.11] *Mentally add and subtract:* • *tenths* • *one-digit whole numbers and tenths* • *complements of 1.* [F5.12] *Add and subtract decimals with a different number of decimal places.* [F5.13] Round decimals with two decimal places to the nearest whole number and to one decimal place. [F5.14] Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. [F5.15] Read, write, order and compare numbers with up to three decimal places *e.g. put these decimals in order starting from the smallest.* [F5.16] Solve problems *and puzzles* involving number up to three decimal places, *checking the reasonableness of answers.* [F5.17] Recognise the per cent symbol (%) and understand	Divide proper fractions by whole numbers. [F6.9] Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places: eg. 205.6 ÷ 100 = 1.056. eg. 1.408 x 100 = 140.8 ? ÷ 1000 = 0.45. [F6.10] Multiply one-digit numbers with up to two decimal places by whole numbers. [F6.11] Use written division methods in cases where the answer has up to two decimal places. [F6.12] *Multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers.* [F6.13] Solve problems which require answers to be rounded to specified degrees of accuracy *and check the reasonableness of answers.* [F6.14] Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. [F6.15]

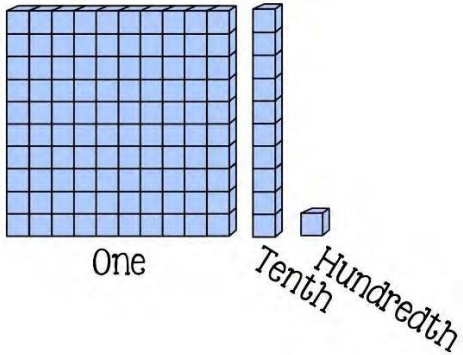
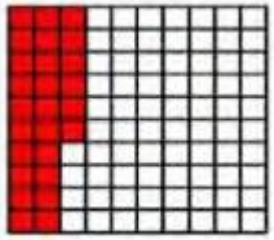
				that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator hundred, and as a decimal fraction. [F5.18] *Recognise that percentages are proportions of quantities: 30% voted yes, 45% voted no and the rest did not vote – what percentage did not vote? as well as operators on quantities: 45% of 160.* [F5.19] Solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25. [F5.20]	

Key vocabulary when teaching fractions

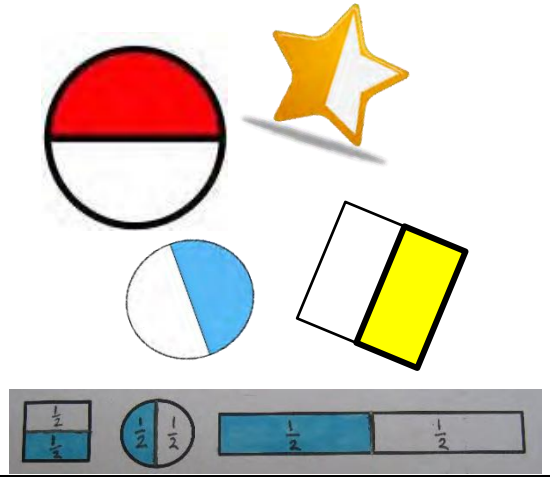
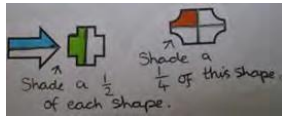
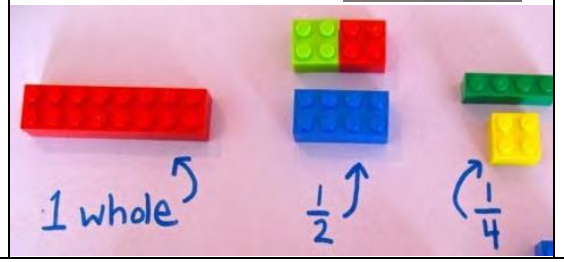
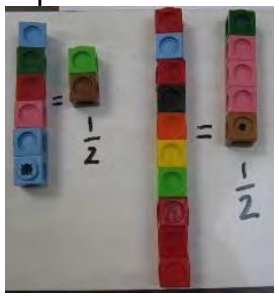
Word	Definition	Example
Fraction	A part of a whole number, quantity or shape. 2. Expressing a division relationship between two integers in the form $\frac{a}{b}$	I have shared my sweets into four equal parts. Everyone will get a fraction of the whole quantity of sweets. One group is a quarter of the whole
Numerator	The number written above the fraction line in a fraction. It indicates the specified number of parts out of the whole. In a division context, it is the dividend.	In the fraction one quarter, one is the numerator.
Denominator	The number written below the fraction line in a fraction. In a measure context, it indicates the number of equal parts into which the whole is divided. In a division context, it is the divisor.	In the fraction one quarter, four is the denominator.
Unit fraction	A fraction with a numerator of one.	One-third is a unit fraction.
Non-unit fraction	A fraction with a numerator greater than one.	Two thirds is a non-unit fraction.
Equivalent	Equivalent means having the same value. Equivalent fractions have the same value.	$\frac{2}{4} = \frac{1}{2}$
Proper fraction	A fraction with a value less than one.	$\frac{1}{2}, \frac{3}{4}, \frac{5}{8}$
Improper fraction	A fraction where the numerator is bigger than the denominator. These fractions are therefore greater than one whole.	$\frac{12}{11}$
Mixed numbers	Numbers consisting of an integer and fractional part.	$1\frac{1}{2}; 3\frac{3}{4}$
Decimal fraction	A fraction expressed in its decimal form.	Half written as a decimal fraction is 0.5
Proportion	A comparison between two or more parts of a whole or group. Proportion expresses a part-whole relationship. This may be represented as a fraction, a percentage or a decimal.	Two thirds of a class were boys. The proportion of the class that is girls is one third.

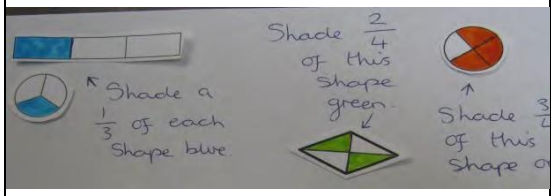
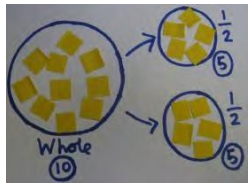
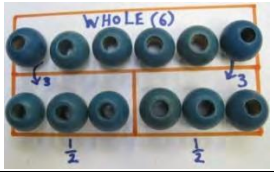
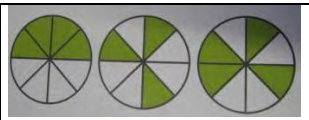
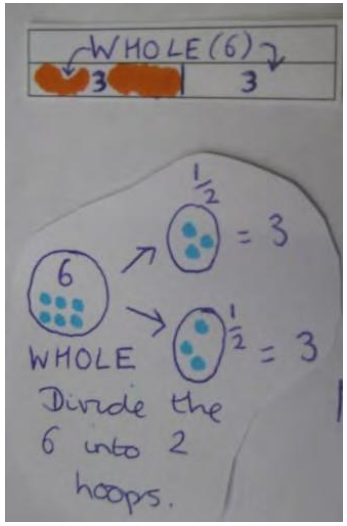
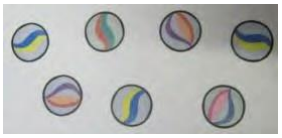
Counting in fractional steps

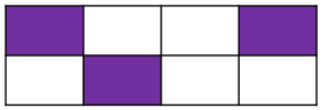
	Objectives	Concrete	Pictorial	Abstract	Challenges
Year 2	Pupils should count in fractions up to 10, starting from any number and using the 1/2 and 2/4 equivalence on the number line.	 How many halves in ....?			**Spot the mistake** 7, 7 $\frac{1}{2}$, 8, 9, 10 8 $\frac{1}{2}$, 8, 7, 6 $\frac{1}{2}$, … and correct it **What comes next?** 5 $\frac{1}{2}$, 6 $\frac{1}{2}$, 7 $\frac{1}{2}$, ..., ... 9 $\frac{1}{2}$, 9, 8 $\frac{1}{2}$, ..., ...
Year 3	Count up and down in tenths	. **Lucie is using counters to show tenths.**  Using tens frames and counters, show the next tenth in the sequence.	 Draw the next tenth in the sequence.		I count backwards four tenths. My answer is $\frac{10}{10}$. What fraction did I start with? **What comes next?** 6/10, 7/10, 8/10, ..., ... 12/10, 11/10, ..., ..., ...

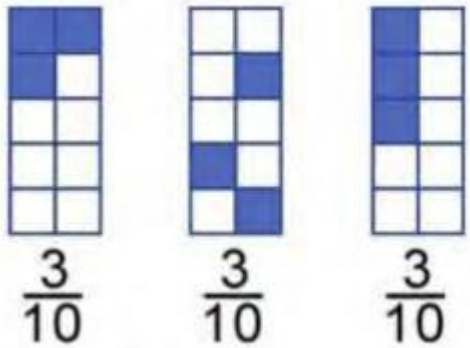
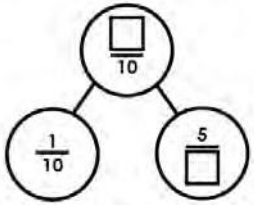
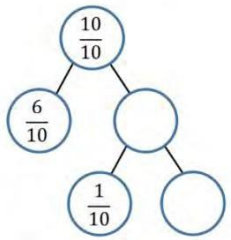
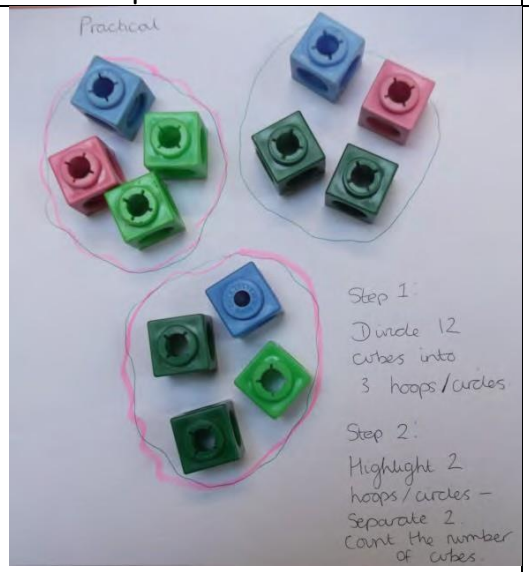
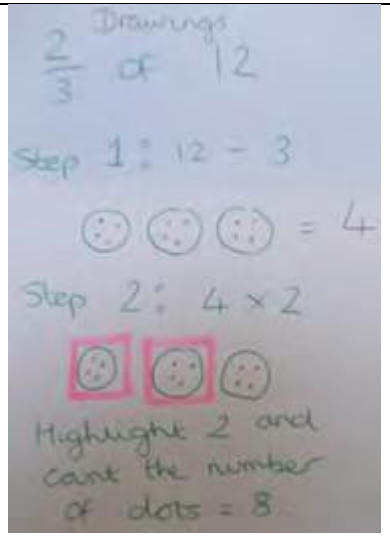
Year 4	Count up and down in hundredths	 Using base 10, children can show counting in hundredths. Base 10 can also be used to show the link between tenths and hundredths.	 Use a hundred square to shade in a sequence of hundredths.	As a class, count up and down in hundredths. Children to continue the following pattern: $1 \div 100 = \frac{1}{100}$, $2 \div 100 = \frac{2}{100}$ What do they notice? What is a hundredths? How many hundredths make up a whole?	**Spot the mistake** sixty hundredths, seventy hundredths, eighty hundredths, ninety hundredths, eleven hundredths … and correct it.

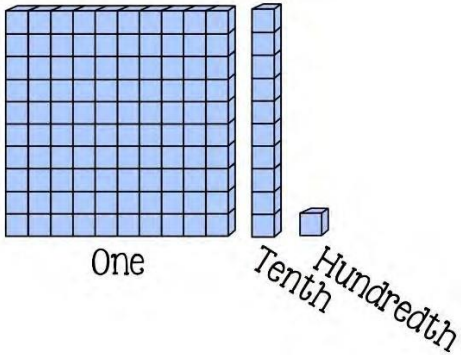
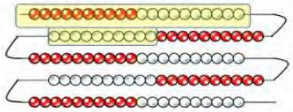
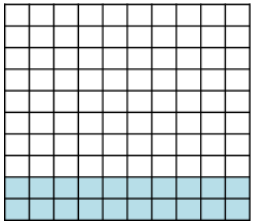
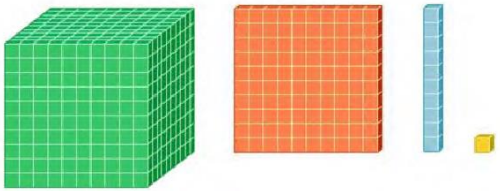
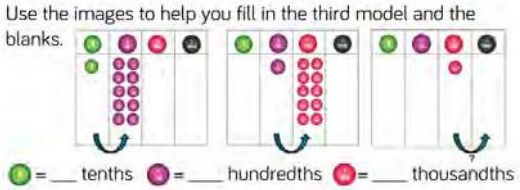
Recognising fractions

	Objectives	Concrete	Pictorial	Abstract	Challenges
Year 1	Recognise, find and name a half as one of two equal parts of an object, shape or quantity.	Cutting up objects (fruit, paper shapes, jaffa cakes) into halves and quarters. Finding a half and a quarter of an object (smarties, beads, multi-link tower).   	Different representations of a half: 	$\frac{1}{2}$ One half	Shading fractions of a range of shapes. 
Year 1	Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	Cutting up objects into quarters. Finding a quarter of an object (smarties, beads, multi-link tower).  	 	$\frac{1}{4}$ One quarter	Identifying halves and quarters from different representations. 

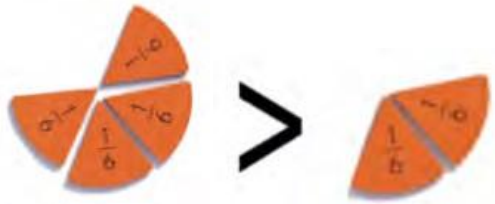
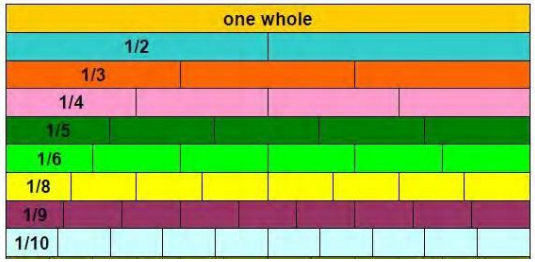
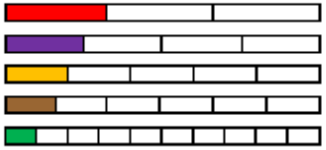
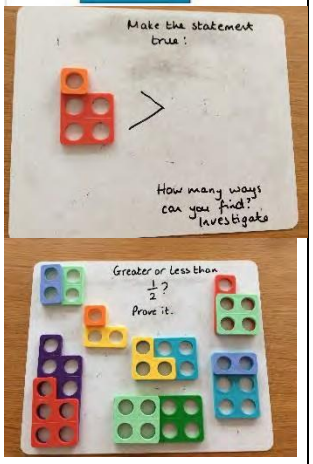
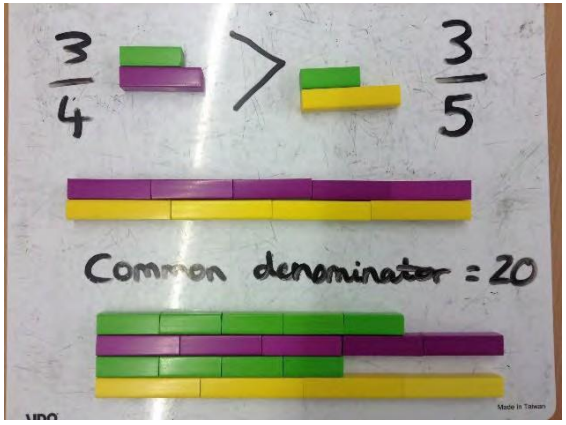
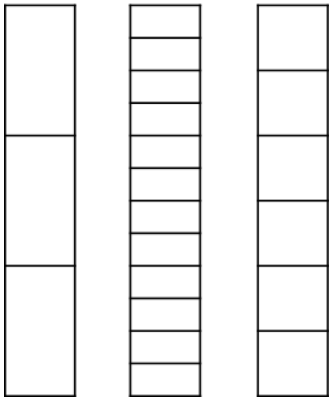
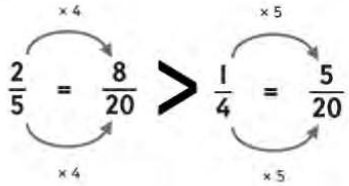
Year 2	Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity		 	$\frac{1}{2}$ of 6 cubes = 3 6 ÷ 2 = 3	 Which of these shapes are $\frac{1}{2}$ green?
Year 2	Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{1}{2}$ and a $\frac{2}{4}$.	Finding a $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ set of objects (less than 20 objects). $\frac{1}{3}$ of 9 cubes = 3  	$\frac{1}{2}$ of 6 cubes = 3 	$\frac{1}{2}$ of 6 cubes = 3 6 ÷ 2 = 3	 Leo lost $\frac{1}{2}$ his marbles in a game. This is what he has left. How many did he start with?

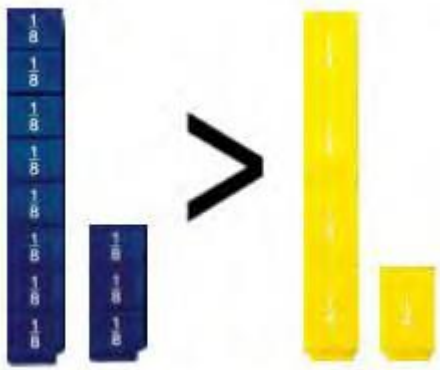
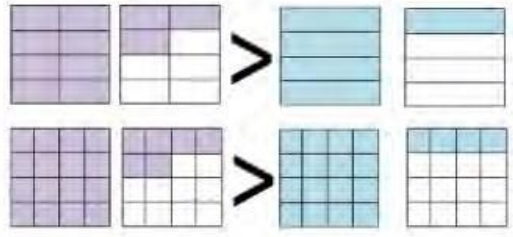
Year 3	Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.	 What fractions are being represented by the numicon? What different fractions can you represent with these classroom objects?  2/3 of the scissors are red.	Circle the fraction represented here.  $\frac{8}{5}$ $\frac{3}{8}$ $\frac{3}{5}$ Read the picture *What fraction of the shape is red?* *What fraction of the shape is blue?*  red = blue = Four out of twelve equal parts $\frac{4}{7}$ Two thirds $\frac{3}{4}$ A B C D     Match the fraction with its representation.	**Challenge 1:** What fractions of the whole is coloured ?  Challenge 2: The shape is divided into 4 equal parts. Do you agree? Explain why. 

Year 3	Recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.	Any combination of ten objects can be used to represent tenths.  There are ten sweets in a packet. Five of them are striped. Write the number of stripy sweets as a fraction. Counters and tens frames can also be used to represent tenths.	 $\frac{3}{10}$ $\frac{3}{10}$ $\frac{3}{10}$	 Complete the part whole model. $\frac{5}{10}$ + _____ = $\frac{10}{10}$	Fill in the missing values. Explain how you got your answers. 
Year 3	Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators			$\frac{1}{5}$ of 15 sweets = 3 as 15 ÷ 5 = 3 $\frac{3}{5}$ of 15 sweets = 9 as 15 ÷ 5 = 3 and 3 x 3 =9	**True or false?** 2/10 of 20cm = 2cm 4/10 of 40cm = 4cm 3/5 of 20cm = 12cm  This is $\frac{2}{5}$ of a bag of marbles. How many marbles are in a full bag?

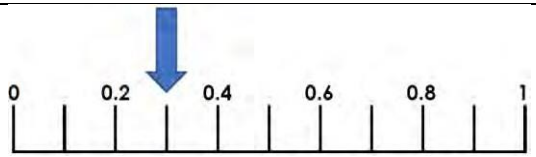
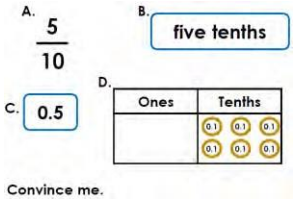
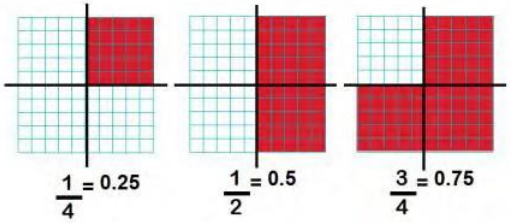
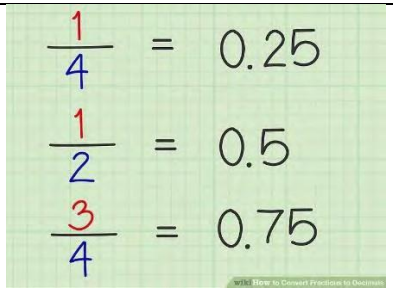
Year 4	Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten	 Using base 10, children can show hundredths. Base 10 can also be used to show the link between tenths and hundredths. If the whole bead string represents one whole, what decimal is represented by the highlighted part? Can you represent this on a 100 square? 	Which of the following statements are correct?  • 20 hundredths is equivalent to 2 tenths. • 2 hundredths is equivalent to 20 tenths.	$\frac{1}{10}$ of 60 = 0.6 because 60 ÷ 100 = 0.6 $\frac{1}{10}$ of 70 = 0.7 so $\frac{1}{100}$ of 70 = 0.07	 What hundredths are the arrows pointing to?
Year 5	Recognise and use thousandths and relate them to tenths and hundredths.	 Using base 10 with the thousand cube as a whole, children can show thousandths. Base 10 can also be used to show the link between tenths, hundredths and thousandths.		$\frac{7}{10} = \frac{\quad}{100} = \frac{\quad}{1000}$	**What do you notice?** One tenth of £41 One hundredth of £41 One thousandth of £41 Continue the pattern What do you notice? 0.085 + 0.015 = 0.1 0.075 + 0.025 = 0.1 0.065 + 0.035 = 0.1 Continue the pattern for the next five number sentences.

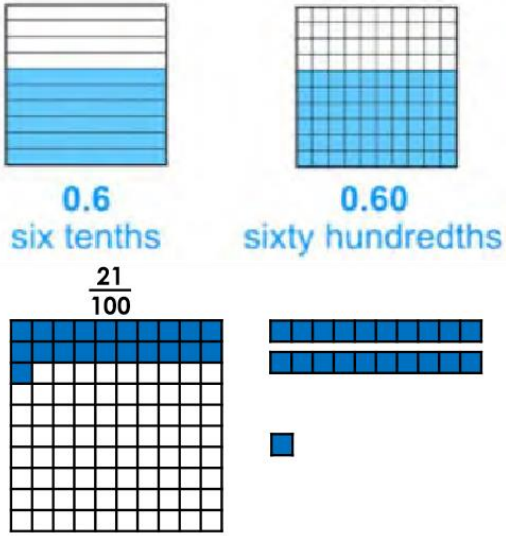
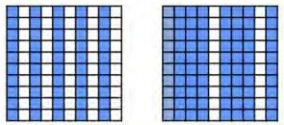
Comparing fractions

	Objectives	Concrete	Pictorial	Abstract	Challenges
Year 3	Compare and order unit fractions, and fractions with the same denominators	 Using strips of paper, compare these fractions using the >, < or = symbols. $\frac{3}{4}$ ◯ $\frac{1}{4}$ $\frac{1}{6}$ ◯ $\frac{5}{6}$ $\frac{3}{8}$ ◯ $\frac{5}{8}$	 Unit fractions: The greater the denominator, the smaller the fraction.  $\frac{1}{10}$ ◯ $\frac{1}{4}$ $\frac{1}{3}$ ◯ $\frac{1}{6}$ $\frac{1}{5}$ ◯ $\frac{1}{4}$	Place the fractions on the number line.  $\frac{2}{4}$ $\frac{3}{4}$ $\frac{1}{4}$ Complete the missing numerators from these ordered fractions. $\frac{1}{5}$ $\frac{2}{5}$ $\frac{\quad}{5}$ $\frac{4}{5}$ $\frac{\quad}{5}$	 
Year 5	Compare and order fractions whose denominators are all multiples of the same number	 	$\frac{2}{3}$ $\frac{7}{12}$ $\frac{5}{6}$  Use these models, to compare and order these fractions.	 When comparing and ordering fractions with different denominators, children can write out their times tables to find the common denominator.	Imran put these fractions in order starting with the smallest. Are they in the correct order? Two fifths, three tenths, four twentieths How do you know?

Year 6	Compare and order fractions, including fractions >1			$2\frac{1}{5}$ ◯ $2\frac{3}{8}$ Use the digit cards to complete the statements below: 5 6 3 4 $\frac{\square}{\square} > \frac{\square}{\square}$ $\frac{\square}{4} < \frac{6}{\square}$ Find three examples of ways you could complete the statement: $\frac{\square}{\square} < \frac{\square}{\square}$ Can one of your ways include an improper fraction?	Give an example of a fraction that is greater than 1.1 and less than 1.5. Now another example that no one will think of. Explain how you know.

Finding fraction and decimal equivalence

	Objectives	Concrete	Pictorial	Abstract	Challenges
Year 3	Recognise tenths as fractions and decimals	 $\frac{\square}{10}$ 0.____ Use the place value counters and tens frames to complete the fraction and decimal.	 True or false? The arrow shows 0.5	$\frac{3}{10}$ = ___.___ 0.7 = _	Which is the odd one out? 
Year 4	Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$	Use base 10 to see how many hundredths are needed to cover $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ and this can be used to show the decimal equivalence.			**Ordering** Put these numbers in the correct order, starting with the smallest. $\frac{1}{4}$ 0.75 5/10 Explain your thinking

Year 4	Recognise tenths and hundredths as fractions and decimals		 True or false? 21 hundredths can be partitioned into 2 tenths and 1 hundredth.	$\frac{1}{10} = 0.1$ $\frac{3}{10} = 0.3$ $\frac{5}{10} = \frac{1}{2} = 0.5$ $\frac{8}{100} = 0.08$	 Marcus is using hundred squares to represent one whole and four tenths. Is Marcus correct? Explain your answer

Year 5

Recognise thousandths, hundredths and tenths as fractions and decimals

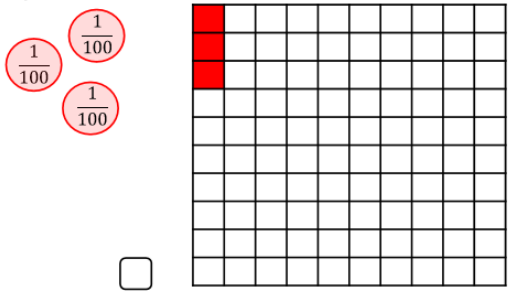
Use the models to record equivalent decimals and fractions.

$0.3 = \frac{3}{10} = \frac{30}{100}$

Use place value counters and base 10 to represent the relationship between fraction hundredths and decimals hundredths 0.01

What fraction is being shown in both representations?

Can you convert this in to a decimal?

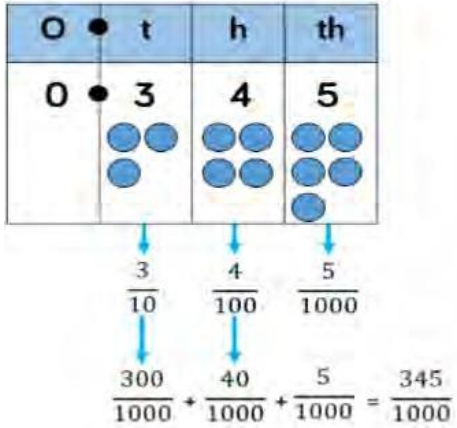


The fraction $\frac{\square}{\square}$ is the same as the decimal _____

Pictorial Representation	Decimal	Decimal – expanded form	Fraction	Fraction – expanded form	In words
	4.251	$4 + 0.2 + 0.05 + 0.001$	$4\frac{251}{1000}$	$4 + \frac{2}{10} + \frac{5}{100} + \frac{1}{1000}$	four ones, two tenths, five hundredths and one thousandth
	4.512				
			$4\frac{25}{1000}$		
				$4 + \frac{5}{10} + \frac{1}{1000}$	

June is converting decimals to thousandths

$0.345 = \frac{\square}{1000}$



Use June's method to convert the decimals to thousandths

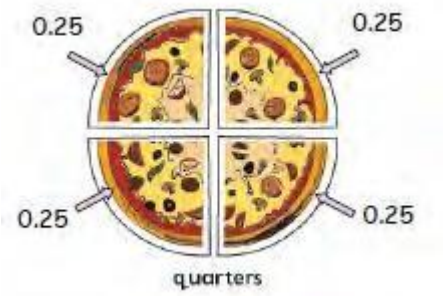
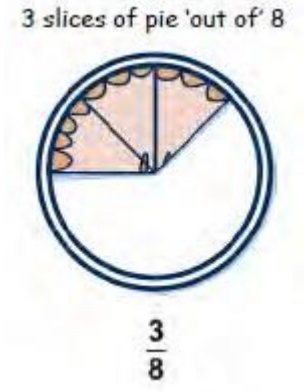
0.276

0.029

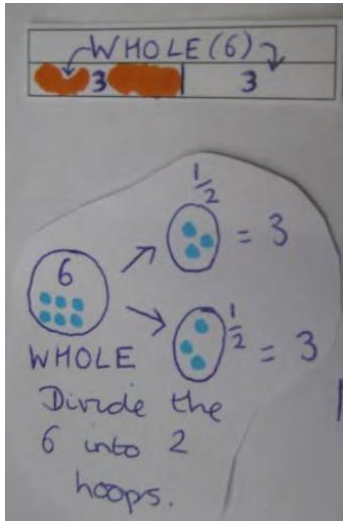
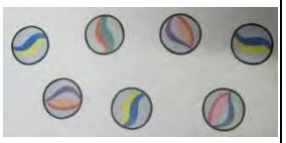
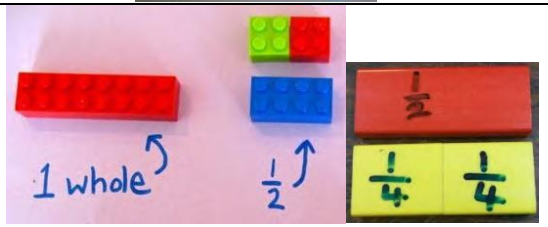
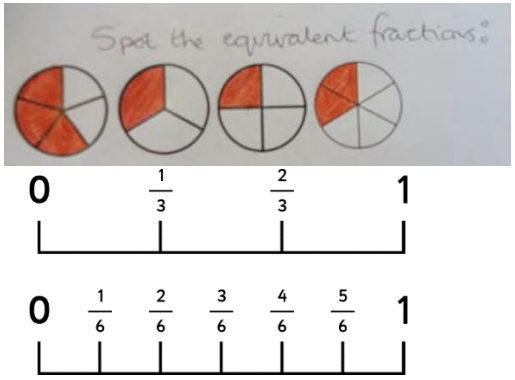
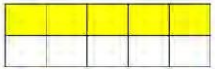
1.286

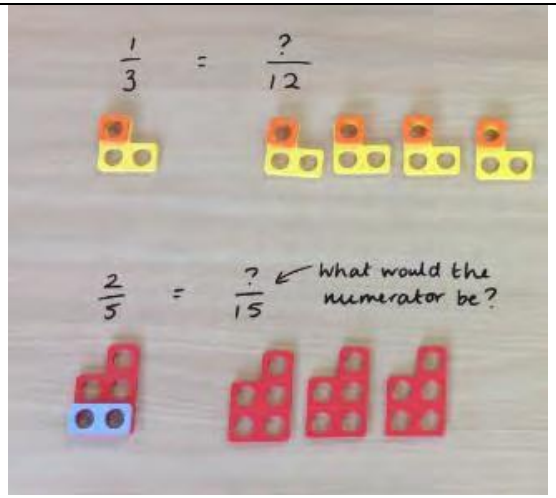
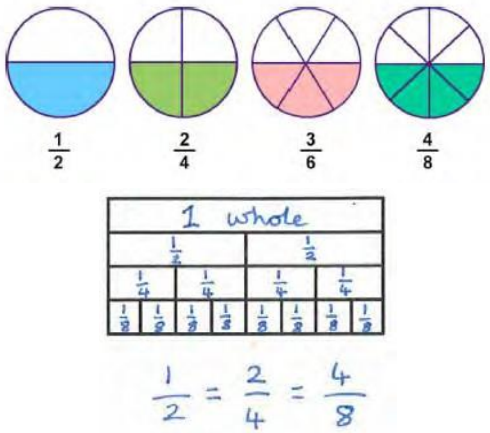
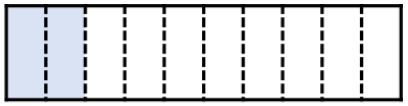
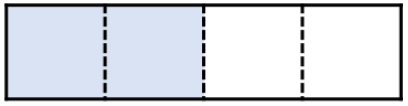
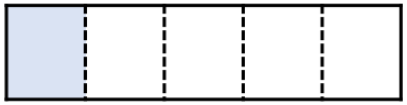
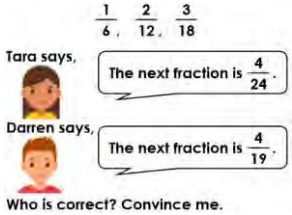
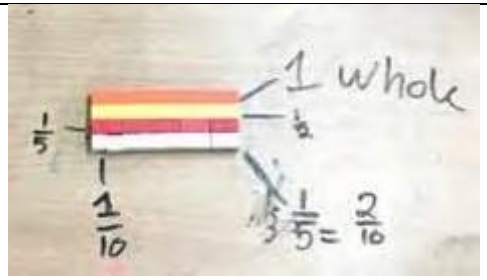
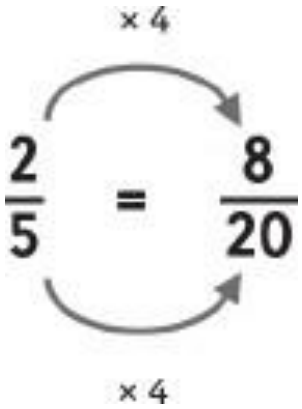
Another and another
Write a fraction with a denominator of one hundred which has a value of more than 0.75?

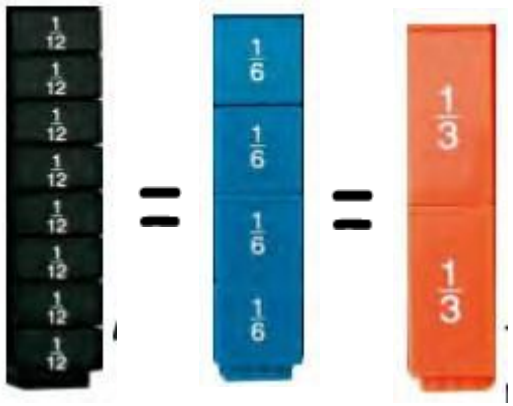
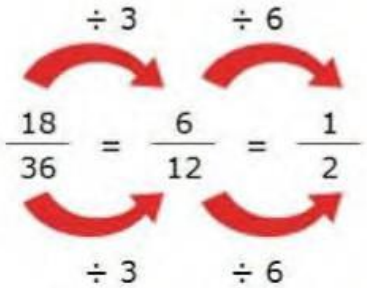
Ordering
Put these numbers in the correct order, starting with the largest. 7/10, 0.73, 7/100, 0.073, 0.7

Year 6	Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3 / 8)			$\frac{3}{8}$ 3 'out of' 8 is the same as 3 'divided by' 8 $3 \div 8 = 0{\cdot}375$ So $\frac{3}{8} = 0{\cdot}375$	**Another and another** Write a unit fraction which has a value of less than 0.5? **Complete the pattern** $\frac{1}{8}$ | $\frac{2}{8}$ | $\frac{3}{8}$ | $\frac{4}{8}$ 0.375 | ??? | ??? | ??? Complete the table.

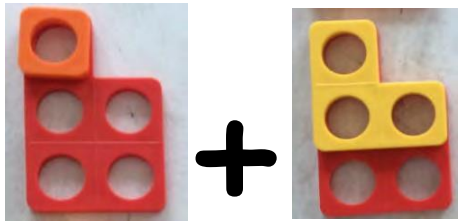
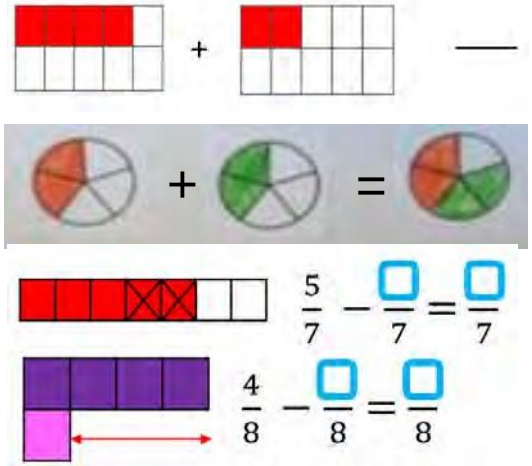
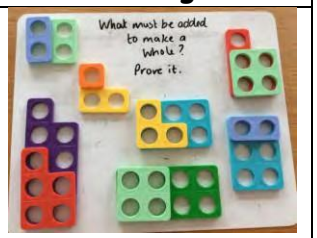
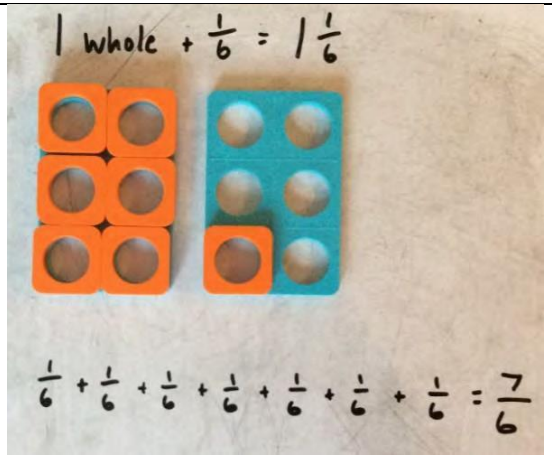
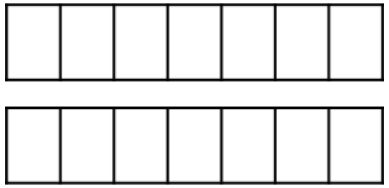
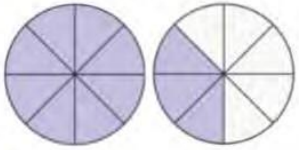
Equivalent fractions

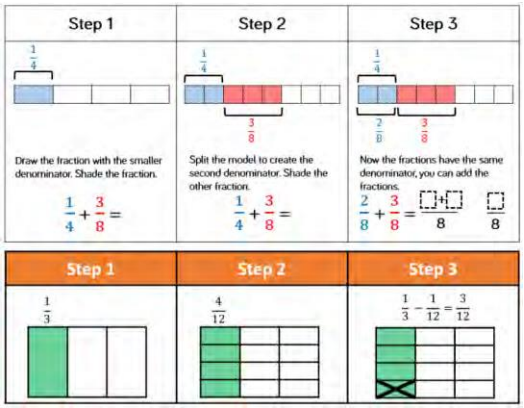
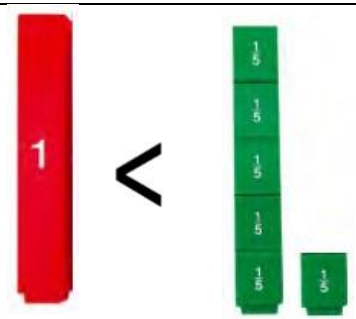
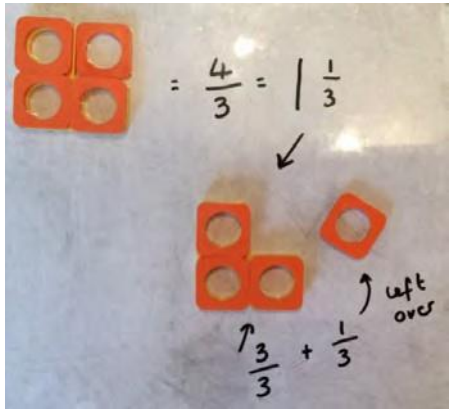
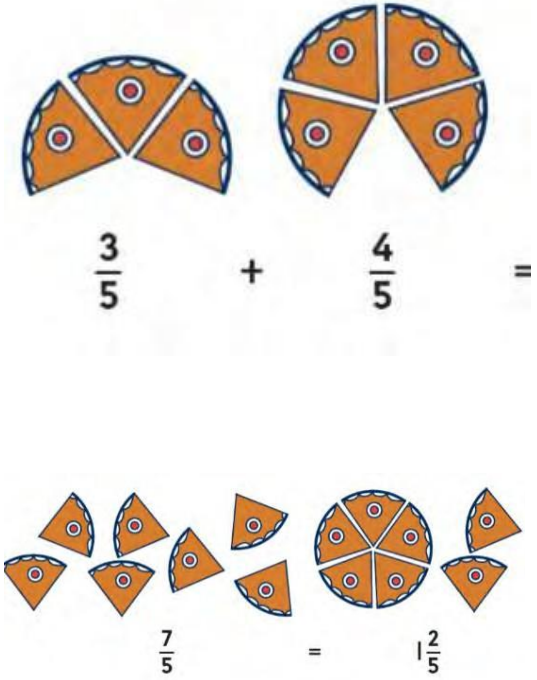
	Objectives	Concrete	Pictorial	Abstract	Challenges
Year 2	Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{1}{2}$ and a $\frac{2}{4}$	Finding a $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ set of objects (less than 20 objects). $\frac{1}{3}$ of 9 cubes = 3  	$\frac{1}{2}$ of 6 cubes = 3 	$\frac{1}{2}$ of 6 cubes = 3 6 ÷ 2 = 3	 Leo lost $\frac{1}{2}$ his marbles in a game. This is what he has left. How many did he start with?
Year 3	Recognise and show, using diagrams, equivalent fractions with small denominators	 How many quarters are equivalent to a half?		Images can be used to identify equivalent fractions. $\frac{1}{2} = \frac{\square}{6} = \frac{\square}{12}$	Here is a diagram showing $\frac{1}{2}$  Draw 3 more diagrams showing $\frac{1}{2}$ and write the equivalent fractions.

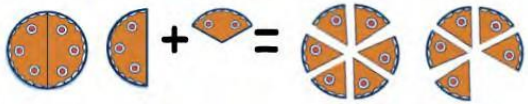
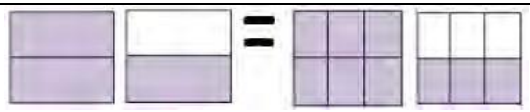
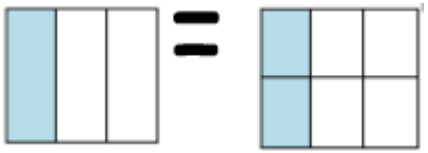
Year 4	Recognise and show, using diagrams, families of common equivalent fractions		 Which two fractions are equivalent? **A.**  **B.**  **C.** 	$\frac{1}{6} \times \frac{\square}{\square} = \frac{4}{24}$	**Odd one out.** Which is the odd one out in each of these trio s $\frac{3}{4}$ 9/12 4/6 9/12 10/15 2/3 Why? Look at the sequence below: 
Year 5	Identify, name and write equivalent fractions of a given fraction, represente d visually, including tenths and hundredths	 Children can create their own fraction wall using Cuisenaire.			**What do you notice?** Find 30/100 of 200 Find 3/10 of 200 What do you notice? Can you write any other similar statements?

Year 6	Use common factors to simplify fractions; use common multiples to express fractions in the same denominatio n	 Children can use fraction walls to create equivalent fractions.			In each number sentence, replace the boxes with different whole numbers less than 20 so that the number sentence is true: 1/□ = 3/□ □/3 = □/12 □/□ = □/□

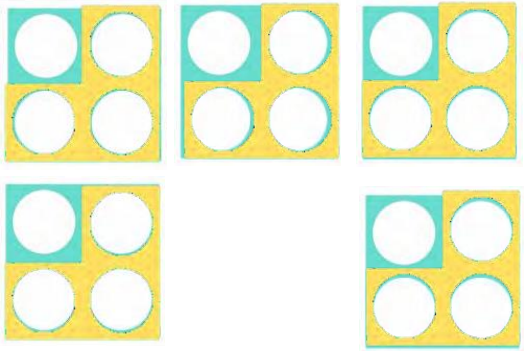
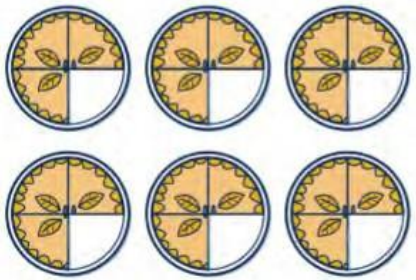
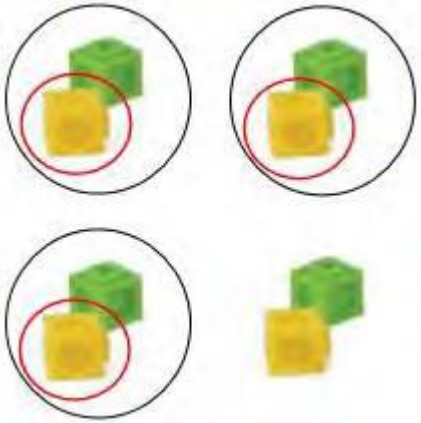
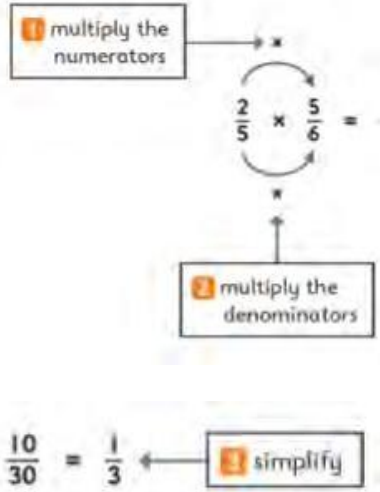
Adding and subtracting fractions

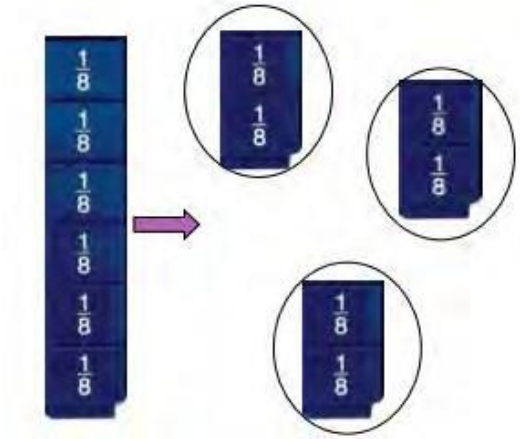
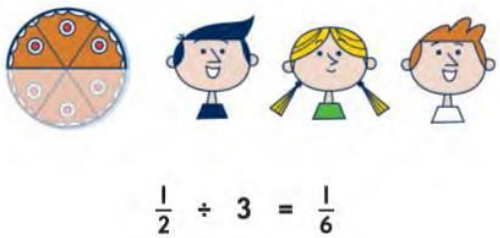
	Objectives	Concrete	Pictorial	Abstract	Challenges
Year 3	Add and subtract fractions with the same denominator within one whole			$\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$ $\frac{5}{8} - \frac{2}{8} = \frac{3}{8}$	  What fractions could you have added together to get this answer?
Year 4	Add and subtract fractions with the same denominator		$\frac{4}{7} + \frac{6}{7} = \frac{\square}{\square}$  $\frac{11}{8} - \frac{5}{8} = \square$ 	$\frac{3}{8} + \frac{6}{8} = \frac{\square}{8} + \frac{2}{8} = \frac{\square}{8}$	Use the digit cards to complete this calculation. You can use each card more than once if you wish. 5 7 12 3 $\frac{15}{\square} - \frac{\square}{\square} = \frac{\square}{\square}$

Year 5	Add and subtract fractions with the same denominator (see Years3 + 4) and multiples of the same number	 $\frac{8}{20} + \frac{5}{20} = \frac{13}{20}$ $\frac{2}{5} + \frac{1}{4} = \frac{13}{20}$		$\frac{4}{12} + \frac{1}{3} = \frac{\square}{\square}$ $\frac{3}{8} + \frac{5}{24} = \frac{\square}{\square}$	Using the numbers 3, 4, 5 and 6 only once, make this sum have the smallest possible answer: $\frac{\square}{\square} + \frac{\square}{\square} =$
Year 5	Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. 2 / 5 + 4 / 5 = 6 / 5 = 1 1 / 5)	 		$\frac{7}{2} = 3\frac{1}{2}$ because 7 ÷ 2 = 3 with 1 half left over $2\frac{1}{3} = \frac{7}{3}$ because 2 x 3 = 6 with 1 third left to add	$\frac{3}{4}$ and $\frac{1}{4}$ = 4/4 = 1 4/4 and $\frac{1}{4}$ = 5/4 = 1 $\frac{1}{4}$ 5/4 and $\frac{1}{4}$ = 6/4 = 1 $\frac{1}{2}$ Continue the pattern up to the total of 2.

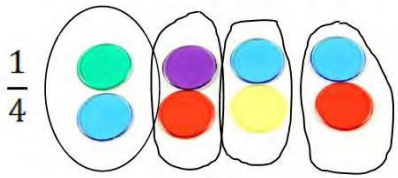
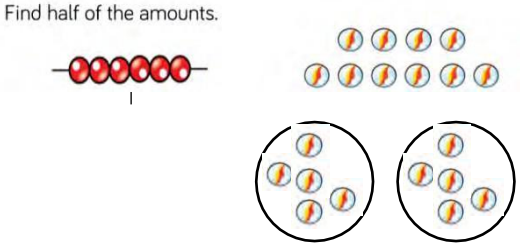
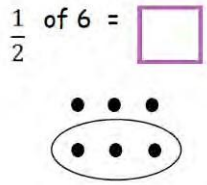
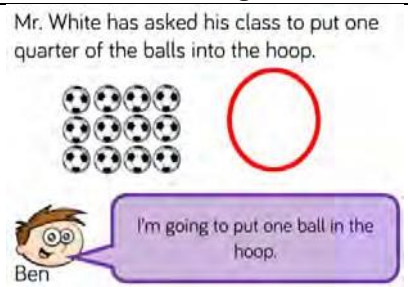
Year 6	Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions		 $1\frac{1}{2} = \frac{3}{2}$ $\frac{3}{2} = \frac{9}{6}$  $\frac{1}{3} = \frac{2}{6}$	$1\frac{1}{2} + \frac{1}{3} = 1\frac{5}{6}$ because $1\frac{1}{2} = \frac{3}{2}$ $\frac{3}{2} = \frac{9}{6}$ and $\frac{1}{3} = \frac{2}{6}$ so $\frac{9}{6} + \frac{2}{6} = \frac{11}{6} = 1\frac{5}{6}$	The answer is 1 2/5 , what is the question? **Another and another** Write down 2 fractions with a total of 3 4/5. … and another, … and another, …

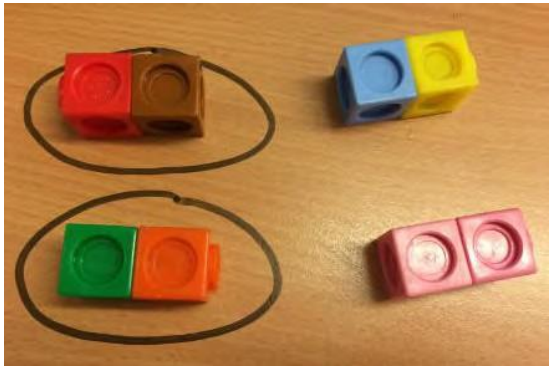
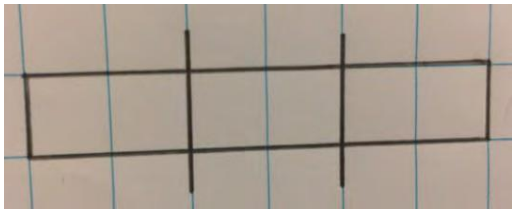
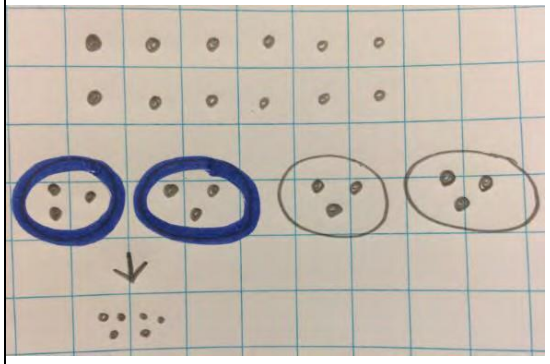
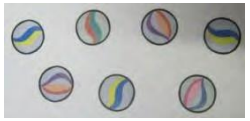
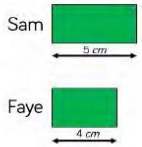
Multiplying and dividing fractions

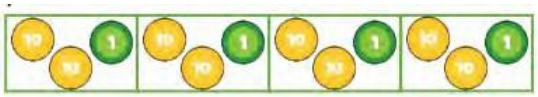
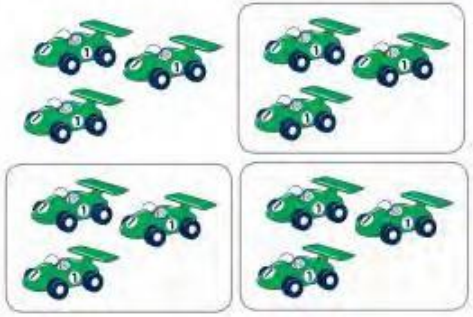
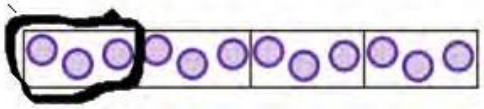
	Objectives	Concrete	Pictorial	Abstract	Challenges
Year 5	Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	 6 lots of $\frac{3}{4}$	 Change to a mixed number: 	$\frac{3}{4} \times 6 = \frac{18}{4}$ Change to a mixed number: $\frac{18}{4} = 4\frac{2}{4}$	**Continue the pattern:** $\frac{1}{4} \times 3 = \frac{1}{4} \times 4 = \frac{1}{4} \times 5 =$ Continue the pattern for five more number sentences. How many steps will it take to get to 3? The answer is $2\frac{1}{4}$, what is the question Give your top tips for multiplying fractions
Year 6	Multiply simple pairs of proper fractions, writing the answer in its simplest form	 $\frac{1}{2}$ of $\frac{3}{4}$	$\frac{1}{2}$ of $\frac{3}{4}$ 	$\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$ 	Can you write your top tips for multiplying proper fractions?

Year 6	Divide proper fractions by whole numbers	 $\frac{6}{8} \div 3 = \frac{2}{8}$	 $\frac{1}{2} \div 3 = \frac{1}{6}$	$\frac{1}{2} \div 3 = \frac{1}{6}$ Keep it, change it, flip it! $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$	**Continue the pattern:** 1/3 ÷ 2 = 1/6 1/6 ÷ 2 = 1/12 1/12 ÷ 2 = 1/24 What do you notice? $\frac{1}{2} \times \frac{1}{4} =$ The answer is 1/8 , what is the question (involving fractions / operations)

Finding fractions of an amount

	Objectives	Concrete	Pictorial	Abstract	Challenges
Year 1	• Find a $\frac{1}{2}$ of a quantity. • Find a $\frac{1}{4}$ of a quantity.	Finding a half and a quarter of an quantity: Find a half of the tower:   Find a quarter of 8 counters: 	Finding a half and a quarter of an quantity:  Beads and marbles can be used as a concrete resource prior to the pictorial representations. Other pictorial representations include drawing circles to represent objects and arrays.	Writing a number sentence alongside the concrete or pictorial representation: 	 Do you agree with Ben?

Year 2	Find $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity.	Using numicon to find $\frac{1}{4}$ of 12:  Which numicon piece fits into 12 exactly 4 times – 3 so a $\frac{1}{4}$ of 12 is 3. To find $\frac{3}{4}$ count up the value of 3 of these 3 pieces = 9. Find $\frac{2}{4}$ of 8: First, use the multilink to find $\frac{1}{4}$. (the 8 cubes have been shared into 4 groups). Then, circle 2 of the groups as you want to find $\frac{2}{4}$ and count the total number of cubes. 	Find $\frac{1}{3}$ of 6:  Find $\frac{2}{4}$ of 12: First, share the dots between 4 circles to find $\frac{1}{4}$ and then highlight two of the groups as you want to find $\frac{2}{4}$ and count the total number of dots. 	Writing a number sentence alongside the concrete or pictorial representation.	Leo lost $\frac{1}{2}$ his marbles in a game. This is what he has left. How many did he start with?  Sam and Faye each have a piece of ribbon that they have cut into quarters.  How long was Sam's whole piece of ribbon? How long was Faye's whole piece of ribbon?

Year 3	Find a fractions of a discrete set of objects: (unit fractions and non-unit fractions with small denominators).	For Years 3 and 4, place value counters can be used to support division when finding fractions of a quantity. For example: Using a bar model and place value counters to find $\frac{3}{4}$ of 84:  To find $\frac{3}{4}$ of 84, the total of the place value counters in 3 of the boxes can be calculated.  = 63.	$\frac{3}{4}$  Using a bar model and drawing counters to find a $\frac{3}{4}$ of 12: 	$\frac{1}{5}$ of 15 sweets = 3 because 15 ÷ 5 = 3. $\frac{2}{5}$ of 15 swets = 6 because 15 ÷ 5 = 3 and 3 x 2 is 6.	Kayleigh has 12 chocolates. On Friday, she ate $\frac{1}{4}$ of her chocolates and gave one to her mum. On Saturday, she ate $\frac{1}{2}$ of her remaining chocolates, and gave one to her brother. On Sunday, she ate $\frac{1}{3}$ of her remaining chocolates. How many chocolates does Kayleigh have left?
Year 4	Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions.		$\frac{1}{7}$ of 56 = 56 ÷ ☐  Once $\frac{1}{7}$ has been calculated, this can be used to find $\frac{2}{7}$, $\frac{3}{7}$ etc. For $\frac{3}{7}$ 3 boxes can be circled and their totals added up. Dots could be drawn in the boxes to support the division of 56 by 7.	$\frac{2}{3}$ of £18 £18 ÷ 3 = £6 £6 x 2 = £12	How many ways can you make the statement correct? $\frac{2}{9}$ of 81 > $\frac{3}{4}$ of ☐ Complete the missing number. $\frac{1}{6}$ of ☐ = 42

Tier 2 or General Academic Terms: words whose meaning varies by context and discipline			Tier 3 or domain-specific Terms: terms that have a fixed meaning and are used only in the context of Maths	
Average	Interpret	Partition	Place value	
Difference	Negative	Concrete	Multiples	
Expression	Positive	Abstract	Factors	
Figure	Order	Measure	Algebra	
Model	Duration	Capacity	Geometry	
Pattern	Round	Mass	Quadrant	
Plot	Inverse	Heavier/lighter	Arithmetic	
Prime	Convert	Quicker/slower/Volume	Ratio	
Similar	Decomposition	Right/left	Percentage	
Table	Grid	Up/down	Number sentence	
Whole	Operations	Clockwise/anticlockwise	Mixed operations	
Add	Chronological	Middle/bottom	Decimal	
Subtract	Table	Above	Prime number	
Multiply Divide	Term	Between	Integer	
Area	Digital	Inside/outside	Perimeter	
Convert	Analogue	Distance	Rectilinear	
Formula	Average	Volume	Metric	
Combine	Mean	Smallest/largest	Imperial	
Composite	Parallel	Shortest/longest	Vertice	
Carrying	Perpendicular	Problems	Axis	
Forwards/backwards	Position	Scale	Nth term	
Steps	Properties	Graph	Bar chart	
Symbols	Angles	Double	pictogram	
Count	Straight	Symmetry	Cardinal number	
Identify	Irregular	Columnar	Circumference	
Represent	Regular	Investigate	Denominator	
Objects	Movement direction	Difference	Numerator	
Pictorial	Proportion	Grouping	Number line	
Calculate		Sharing	Equation	
Estimate		Statistic	Linear equation	
Compare		Remainder	Quadrilateral	
Diagonal		Data	Rhombus	
Determine		Improper	Venn diagram	
Acute		Proper		
Obtuse		Cube		
Reflex		Equivalent		